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MAN AND HIS HANDIWORK.

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MAN AND HIS HANDIWORK.

BY

THE REV. J. G. WOOD.

PUBLISHED UNDER THE DIRECTION OF
THE COMMITTEE OF GENERAL LITERATURE AND EDUCATION
APPOINTED BY THE SOCIETY FOR PROMOTING
CHRISTIAN KNOWLEDGE.

LONDON:
SOCIETY FOR PROMOTING CHRISTIAN KNOWLEDGE,
NORTHUMBERLAND AVENUE, CHARING CROSS, W.C.;
43, QUEEN VICTORIA STREET, E.C.;
26, ST. GEORGE'S PLACE, HYDE PARK CORNER, S.W.
BRIGHTON: 135, NORTH STREET.
NEW YORK: E. & J. B. YOUNG & CO
1886.

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PREFACE.

THIS book is in no sense a treatise on Technology, but is a brief sketch of human handiwork. It deals with Man, to whom was given the Divine command to subdue the earth, and shows some of the means whereby he is steadily carrying out his high mission. That it should be an exhaustive work is impossible, as each of the subjects which have been lightly touched upon would in that case have needed many volumes such as the present. I have, therefore, been compelled to select only a few of the principal links in the chain of human invention, so as to show how the productions of the highest civilisation of the present day are developed from man's handiwork of earlier epochs, and are the result of successive improvements.

The ship of the present day, for example, has been developed from the hollowed log, the pianoforte is

directly derived from the tightened bow-string, and the carpenter's tools from the flint-flake.

The reader must bear in mind that, when mention is made of the manners and customs of uncivilised man, they must be understood as referring to the period before the influence of civilisation had modified, or, in some cases, abolished them. For a more detailed account of the scope of the work, the reader is referred to the Introductory Chapter.

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INTRODUCTORY CHAPTER.

SOME half-century before these pages were written, the science of Geology was in its infancy, and those who studied it were either avoided as atheists or ridiculed as fools.

The late Dr. Buckland, to whom Geology is so much indebted, succeeded in showing that the charge of atheism was absurd, and that the folly was on the part of those who refused to believe facts that had been proved beyond any possibility of contradiction. He did not, however, escape an occasional sly shaft on the part of his contemporaries who were skilful with pen and pencil, and many were the witty epigrams and caricatures that took Dr. Buckland as their theme.

One of these productions was a parody on his lectures on the extinct animals, and represented a Saurian as lecturing on a human skull to an audience of fellow Saurians. In describing the skull, the lecturer draws attention to the character of the teeth and the feebleness of jaw, and expresses his inability to understand how the animal could have obtained food.

He might well wonder, for, without external aid, man is one of the most helpless of animals. Though gifted with the hands which enable him to subdue the earth and become its master, he would perish of hunger and privation were he restricted, like the rest of the animal kingdom, to the implements wherewith he is dowered by Nature. His wants are many, and neither hands nor feet alone can gratify them.

Throughout almost the whole of the habitable world he requires food, a dwelling, and clothing. There are, it is true, a few parts of the world where the almost unchanging climate is that of perpetual summer, so that clothes are not absolutely necessary. A dwelling is only a matter of convenience; and the earth furnishes spontaneously sufficient food to support life.

Such spots are, however, extremely few. Over the greater part of the world, man must die of hunger unless he works hard for his food, and must die of cold if he does not defend his body from the elements with clothes, and shelter himself within a dwelling in the winter-time.

For these purposes tools must be procured, and must not only be procured, but formed by the hands of man.

Here we see at once the tremendous gulf which separates the lowest of mankind from the highest of the beasts. No animal except man ever made a weapon or a tool, or produced fire. Certain animals can be taught to use certain simple tools in a very imperfect manner, but those tools have to be made

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by man, and the lessons in using them must be given by man.

The reason is simple enough. Considering man simply as an animal, no animal but man is in need of tools, and no man can do without them.

The animals which live upon vegetable food have only to go in search of it, and, having found it, to eat it without needing to prepare it. Those which live by hunting require no club wherewith to strike down their prey, no trap wherein to capture it, no spear or dagger wherewith to pierce it at close quarters, and no bow and arrow wherewith to destroy it at a distance.

"Fitzjames's sword was sword and shield," and their bodies and limbs serve them instead of tools and weapons. The paw of the lion or bear is a club provided by Nature,—a club so powerful that with it a polar bear can crush the skull of the walrus. Putting aside for the present the pitfall of the ant-lion and the web of the spider, the tiger that crouches in ambush and springs upon the unsuspecting prey, is a living trap, which can always be set where it will be most successful. So the fierce rush and leap of the chetah make it a living javelin, and the point of the weasel's fang can be driven into the spinal cord of the rabbit as surely as the dagger or spear-point of the hunter can "pith" the bull as he stoops his head for combat.

The presence of a tool, therefore, no matter how rude, betokens the presence of man, the only animal which needs it. I mention this in the present place on account of a theory which was put forward by one

prominent archæologist, and partially if not entirely accepted by others. It is this :—

In the mid-Miocene strata in France there have been discovered some flint-flakes, and a rib of an extinct manatee, which bears marks of cuts artificially made. These facts point to the conclusion that man must have lived in the mid-Miocene period, much earlier than his supposed date.

Then, M. Gaudry points out that, although there are many relics of mammalia in the mid-Miocene strata, they are all of extinct species, and that no mammal then existing has survived to the present day. This is true enough ; but from that fact he deduces a rather remarkable conclusion, *i.e.*, that, as no other mammal has survived, it is not likely that man alone could have done so, and therefore that man did not exist in the mid-Miocene.

But what is to be said of the flint-flakes and cut rib? M. Gaudry's answer to this very awkward question is as follows. Although man did not exist at that epoch, there was a large anthropoid (*i.e.*, man-like) ape, called the Dryopithecus, and M. Gaudry suggests that this ape may have chipped the flints and cut the rib!

To my mind, there never was a feebler attempt at reasoning. It is a pure assumption that, because actual personal relics of man have not yet been found in the mid-Miocene strata, and that no other then-existing mammal has survived, man never existed in that epoch. Exactly the opposite conclusion ought to have been drawn, *i.e.*, that the presence of a tool, or of marks made by a tool, is a proof that the tool

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build houses (which are artificial caves) with the materials which the locality affords. Even the snow itself furnishes man with materials for houses which protect him against cold.

As to the first clause of the Divine command, man replenishes the earth as well as subdues it.

The same individual can live under the equator, in the arctic and antarctic regions, on the flooded districts of the Amazons, and the desert sands of Africa, and can in either case supply himself with food, clothing, and a house. None but man can do so. The lower animals can replenish certain limited portions of the earth, but can subdue none of it, whereas there is no part of the earth which will support animal life in which man cannot thrive, and which he does not, sooner or later, subdue.

How man, by his handiwork, makes himself master of the earth, I have endeavoured to show by a few typical examples of that handiwork. Where it has been possible, I have taken specimens of human manufactures from pre-historic relics, and have traced a few of the successive improvements which man has made upon his own handiwork, from the palæolithic epoch to the present day.

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MAN AND HIS HANDIWORK.

CHAPTER I.

THE HAND AND FOOT.

The Horse and the Piano—The Bat, Whale, Cat, and Monkey—Can a Monkey throw a missile?—Waterton and the reviewers—Baboon at the Crystal Palace—Hand of the Monkey—Hand of the Gorilla, its structure and uses. Knuckle-walking—Foot of the Monkey—Foot of the Gorilla—"Gena"—Photographing a Gorilla—Foot-bones of the Gorilla—Position of the great toe—Fighting attitude of the Bear—The foot of Man—Effects of the boot and shoe—Powers of the untrammelled foot—Device of a savage thief—Concealed weapons—Painting with the foot—Playing the piano with the feet—The cause of civilisation.

A HORSE cannot play the piano.

If Captain Lemuel Gulliver had brought a newly-born foal from the Island of Horses; had that foal been gifted with the intellect of Shakespeare and Newton, and the musical genius of Handel and Beethoven combined; had it been placed under the best musical instructors in the world, it could never learn to play the piano, because it does not possess the physical means for performing such an action.

Neither could a horse wield a bow, or a sword, or an axe, or a spade, much less use a pen or a pencil.

Its hand is exclusively used for locomotion, and has no separate fingers. Even in those cases where animals do possess jointed fingers, it does not follow that they are capable of using tools or implements of any kind.

The fingers of the bat's hand, for example, are very much longer and more slender than those of man, and yet it can only use its hand as an instrument of locomotion.

The fingers of the whale have four joints instead of three, while the hand of the common porpoise has two joints in the thumb, eight in the first finger, six in the middle finger, three in the third or "ring" finger, and two in the little finger; while the first finger of the round-headed dolphin has no less than fourteen joints.

Yet, in these very opposite species of animal, the fingers are not free, but are bound together by membranous material; so that, in the one case, the hand serves to support the body in the air, like the wing of a bird, and, in the other case, to balance it in the water, like the fin of the fish. In neither instance could it grasp a tool or weapon.

Now we will take the hand of the cat, which approaches much nearer to the human hand, inasmuch as it is not solely used as an instrument of locomotion, but is also employed in seizing prey. Still, if a cat depended for its living on the use of a tool, it would be as helpless as the horse, the bat, the whale, or the dolphin.

The fingers are separate, jointed, and partly flexible. But the thumb has no connection with them. Its

development is so slight, compared with that of the fingers, that it only forms a little projection on the wrist, armed with a claw, with which we are sometimes rather too familiar when playing with pussy. Now, the properly developed thumb is so constructed that its tip can be applied to the tip of each of the fingers, and that when the hand is closed, so as to form a fist, it can be folded over the joints of the fingers.

Suppose we now take the hand of the monkey, as affording the nearest approach to that of man. Here we find the thumb wanting in those very characteristics which make it essential to man. It is very short, very feeble, and, although it can be partially opposed to the fingers when they are closed, it cannot execute those rotatory movements which enable the hand of man to perform such varied tasks.


Hand of monkey.

A monkey can be taught to use a stick like a club, though I believe that no wild monkey ever used such a weapon, its long and sharp canine teeth, aided by the grasp of the hands, being quite sufficient for offensive purposes.

It can, naturally, throw stones, and other missiles, with a good aim and much force.

The late Charles Waterton flatly denied that any monkey could do so, and boldly asserted that, if any

monkey were provided with any kind of missile, and would throw one of them at him, he would forfeit his whole reputation for credibility. His ire had been roused by an unfriendly critic in *Fraser's Magazine*, and especially by that critic's statement that monkeys *can* throw missiles, and that when he was a boy he "had his eyes full of saw-dust," for taking away a fruit which he had offered to the monkey.

So, in his own slashing style, he wrote the following challenge:—

"This borders on a fraud, if not a fraud outright. The reviewer" (whom Waterton amusingly styles as "peppery"), "combating my statement that no monkey can hurl a projectile, indirectly wishes us to believe that monkeys have the art to do so; and he adduces his own experience by telling us that he himself 'had his eyes full of sawdust.' But he carefully refrains from stating that the monkey did actually *throw* that sawdust in his eyes; so that the reader is left in doubt to determine whether the anterior or the posterior members of the agitated monkey caused the sawdust to reach my reviewer's eyes.

"A monkey, disappointed and in a rage, may well be conceived to flounce and jump about, and, with its posterior as well as with its anterior members, make the sawdust fly in clouds from the bottom of its cage. I have no doubt but that this was the real state of the affair.

"I have now my reviewer fairly within my reach. I now call upon him to demonstrate to me, in *propria persona*, that monkeys can hurl projectiles or throw sawdust.

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"I feel sure that my reviewer is a gentleman; and, on the strength of this, I invite him at once to Walton Hall, whence we will proceed to the best assorted collection of monkeys in the Three Kingdoms; and, if necessary, we will go to the Continent.

"I will provide stones, tiles, lead, pewter-pots, and sawdust, all which things, in my reviewer's belief, have, from time to time, been hurled at men by monkeys. I will obey his orders implicitly. He may place me as near to the monkey as he chooses. Then, should any one of the tribe, great or small, or young or old, throw sawdust or hurl projectiles at me, I will give in, and I will publicly confess, in *Fraser's Magazine*, that the information, which my reviewer has collected from hearsay and from books, is sound and valuable to science; while, on the contrary, that which I have acquired, during a long sojourn in the forests of Guiana (the native haunts of monkeys), is rotten, and not worth a single farthing."

Here, as in other instances, *e.g.*, the question of cannibalism, Waterton fails from a want of logic, having drawn an universal conclusion from a particular premiss. He lived in the haunts of monkeys for many months, and never saw a Guianan monkey throw a missile. Therefore, he draws the conclusion that no monkey can throw missiles, and that, consequently, the reviewer's monkey did not throw sawdust in his eyes.

Now, I have repeatedly seen a baboon throw sawdust, straw, sticks, or anything that it could lay hands on. The animal was chained in a large cage in the

Crystal Palace Monkey Room.' There were a number of smaller monkeys in the cage, but none of them ventured to come within the baboon's reach, the range of which they knew to an inch. Sometimes they would tease and jeer at him, taking care to keep out of his reach, and he would then gather up a double handful of missiles, and fling them at his little enemies.

Having this controversy in mind, I asked my eldest son to accompany me to the Crystal Palace, and test the question ourselves. On our return, I wrote the following note on the margin of my copy of "Waterton's Essays," p. 194, and asked my son to countersign it:—

"I have repeatedly seen a baboon in the Crystal Palace Monkey House throw any missile which was within reach. He threw at me several times, because I gave a nut to a small monkey in the same enclosure. His aim was remarkably good, and he generally keeps a supply of missiles ready to hand. —J. G. Wood, Theodore Wood."

I asked the keeper whether the baboon had been taught to throw, and was assured that the habit was a natural one. I am the more inclined to believe this, because a human being throws missiles with one hand, whereas the baboon invariably employed both hands. I have also noticed that when little monkeys find a nut too hard for their feeble teeth, or too large for their little jaws, and break it with a stone provided for the purpose, they always wield the stone with both hands.

I mention these particulars because, though I wish to show that man could never have become a tool-

maker, still less a fire-worker, had he possessed the hands of the monkey, I wish, at the same time, to show that we ought not to try to exalt the powers of man by denying those of the monkey tribe.

The member of the monkey tribe which approaches nearest to man is the gorilla, but the resemblance is a very superficial one. It is true that the skin of a gorilla may be stuffed, and "set up" in an attitude that man would be likely to assume. Also, the skeleton can be articulated in such a way as to resemble a man standing upright on the soles of his feet —an attitude which no monkey ever did or could assume—the gorilla, perhaps, less than any other member of the monkey tribe.

Right hand. Young gorilla.

In the first place, let us look at the hand of the gorilla, as it is faithfully represented in the accompanying illustration. As I had an opportunity of constantly seeing the baby female gorilla, "Gena," which was exhibited at the Crystal Palace, in August, 1879, I was able to study the appearance and habits of the animal. At a hasty glance, the hand

somewhat resembles that of the negro, the ends of the fingers being soft and plump, and the nails much resembling those of man. But, as soon as the creature began to use its hands, the distinction between man and ape became apparent. In the first place, short as are the fingers, they are practically rendered shorter by being united as far as the first joints, so that they cannot be spread like those of man. The gorilla would be scarcely more capable of playing the piano than the horse would.


Bones of right hand. Gorilla.

Here is a view of the same hand seen in skeleton. Putting aside the difference between the carpal, or wrist, bones, and those of man, we see a very great difference in the jointed portions of the hand. The "metacarpals," or bones which form the palm of the hand, are very long, while those of the fingers are short, and enormously powerful in comparison with those of man. The thumb is quite insignificant, the joints being short, slight, and the "distal," or

endmost, joint being very small, and reaching barely to the ends of the metacarpal bones. That of man reaches nearly as far as the first joint of the fingers.

As soon as the animal puts itself into action, it shows that the primary use of the hand is for locomotion, the gorilla being, practically, a quadruped. The arms are enormously long in proportion to the body and legs, so that when the animal walks it half closes the hands, places the backs of the second and third joints of the fingers upon the ground, and uses them exactly as if they were feet.

This mode of progression is common to all this long-armed, short-legged group, which are, therefore, called "knuckle-walkers" by some systematic zoologists.

Now we come to another and equally important distinction between man and the monkey tribe. I have already mentioned that, in the horse, the bats, the whales, and the cats, the hands are used as instruments of locomotion. So are they with the monkey tribe, those of the more man-like apes being used as I have just described, and those of the other monkeys being used for grasping the branches among which a monkey passes nearly all its life.

Man, however, has other uses for his hands than locomotion. That office devolves wholly upon the feet, which must, therefore, be constructed on a totally different principle from those of the monkeys. In order to set the hand free for carrying out the works which are designed by the intellect of man working through the brain, it is necessary that the foot should

be formed in such a manner that the body can be carried erect without the help of the hands.

No monkey can stand upright, and, though it may seem rather strange, the animal that can stand in the most man-like attitude is not the gorilla, which externally resembles man so much, but the bear, which does not resemble him at all. Suppose that we look at the sole of the right foot of an ordinary monkey, as here shown. A mere glance will tell us that it is not intended to support the entire weight of the body. There is no heel, such as that which is possessed by man, and if we trace the leg as high as the knee, we shall find that the monkey possesses no "calf," this portion of the leg consisting of the muscles which enable man to preserve the poise of the body. The great toe, moreover, is quite unlike that of man, and the whole limb is evidently of a prehensile character, so as to earn for the monkey tribe the title of quadrumana, or four-handed animals.

Foot of monkey.

As the gorilla is acknowledgedly the most man-like of the monkey tribe, we might naturally expect to find the foot much more resembling that of man than does the foot of the ordinary monkey. Exactly the

contrary is the case, as may be seen from the accompanying illustration, which represents the right foot of a young gorilla.

It is evidently intended to be a grasping implement, and a very powerful one it is. The reader's attention is especially directed to the peculiar size and position of the great toe, which is exceedingly powerful, and which projects from the foot at a wide angle.


Foot of young gorilla.

The animal cannot, therefore, stand on the sole of its foot as man does. When it walks on level ground, the toes of the feet are bent and curved inwards, the weight of the body not resting on the sole, but on the edge of the little finger and inner edge of the foot. This was the attitude invariably assumed by "Gena" whenever she traversed the floor of her cage.

On one occasion, I had abundant opportunity of watching the movement of her limbs. Her owner had ordered her to be photographed in the morning, before the public was admitted to the Crystal Palace,

and I happened to enter the building just as the cage, containing "Gena" and her companion, was being taken to Messrs. Negretti and Zambra's photographic rooms. It was a most amusing scene. "Gena" had a companion, a young chimpanzee, who considered herself as "Gena's" nursemaid, and watched over her with the most solicitous care.

Photographing a child of two years old is a most difficult task, but the operators, with all their experience, found that photographing a child was nothing to photographing "Gena."

The little creature seemed to be horribly afraid of the camera, and insisted on dodging behind the chimpanzee, to whom she clung, just as a frightened child clings to its mother or nurse. Then, when "Gena" did not hide herself behind the chimpanzee, the latter always pushed herself in front of "Gena."

Over and over again were attempts made to procure a photograph. The two apes dodged all over the room, on and off the daïs, under the chairs and tables, while ten o'clock, the time for admission of the public, was rapidly approaching. At last the instantaneous process was adopted, and by dint of carrying the camera about, and taking shots at the animals whenever they happened to be still for a moment, the operators succeeded in procuring some good negatives.

This incessant scrambling about was very trying to the operators, but was very interesting to me, as it gave an excellent idea of the mode of progression employed by these apes. Not once did "Gena" raise herself on her hind feet, invariably resting a considerable portion of her weight on the knuckles of

the hands. Indeed, the hands and arms seemed to be the chief organs of locomotion, the little bent legs and crumpled-up feet appearing to take quite a secondary part in progression.

In order to show more strongly the divergence between the foot of man and of the gorilla, I here give the bones of each.

Taking first the bones of the gorilla's foot, the reader can at once see how impossible it is for the animal to stand on the sole of its foot, and why it *must* walk, as "Gena" walked, on the side of the little toe and edge of the foot. This fact throws a strong doubt on the accuracy of Du Chaillu's description. He states that the fighting attitude of the gorilla is erect, and that its chief weapons are its hands and arms.

Foot-bones of gorilla.

Now, as the reader may see, the structure of the feet is such that the animal cannot stand upright without supporting itself by grasping some fixed object with its hands. Its footing would be feeble and uncertain, and its gait tottering, and it is not

likely that any fighting animal would assume the attitude in which it was weakest, when it wished to put forth its utmost strength.

A bear, being a plantigrade animal, would stand erect when in a fighting attitude, so as to get a good blow at the adversary with its fore paws, or to clasp him in its powerful arms, and squeeze the breath out of his body. But, though a bear would act in this manner, it is quite clear that a gorilla could not do so, even if it wished.

Of course, a monkey can be taught to walk on its hind feet. So can a dog, but in neither case is the attitude a comfortable one. The gibbon apes and the spider monkey will often go for a little distance on their hind feet. But their progress is essentially different from the stately walk of man. It is nothing but a short hobbling run, with the body stooping forwards, the knees bent, and the arms held over the head so as to preserve the balance. In the case of the spider-monkey the tail is held high in the air, and in every case the animal soon drops on all fours.

How different is the case with the foot of man, the bones of which are here given. Small as is the surface of the sole of the foot, it is so constructed as to bear the whole weight of the body, and to enable the owner to use his hands.

The long and powerful great toe runs nearly in a line with the other toes, and helps to form the sole of the foot into an elastic tripod, the heel forming one of the three points of support, the ball of the little and fourth toes another, and that of the great toe the third.

We, the full use of whose feet is cramped by boots and shoes, have little practical idea of the real power of the great toe. It can be spread widely from the foot when needed, it is nearly as flexible as the thumb, and is so strong that it can support the whole weight of the body. When the Australian savage ascends a tree, he rests the whole weight of his body on each great toe alternately; and when the Abyssinian or Patagonian is on horseback, his stirrup is a mere loop into which his great toe is thrust.


Foot-bones of man.

The stiff unyielding sole of our boot has deprived the toes of their share in supporting the weight of the body, while the upper leather crushes them together and prevents their expansion. The savage can make full use of his feet, and his toes are nearly as flexible as his fingers.

When he is for the first time brought into contact with civilised man, and naturally wants to steal the wonderful treasures which the white man has brought with him, he almost invariably uses his feet in preference to his hands, and while he thinks that he is diverting the stranger's eyes by the movements of his hands, he will be quietly stealing something with his toes.

When the Australian savages were first met by

Europeans, the latter were terribly deceived by them. When the two parties approached each other, signs of peace were made, and both sides laid down their weapons and met each other apparently unarmed.

But every savage was holding a spear in each foot, and as they walked along they trailed their weapons along the ground, so that until this device was made known they killed many a white man by their treachery.

In our own country we are accustomed to look upon bare feet as we do upon bare heads, as a mark of the most abject poverty, and if a well-dressed man were to walk through the fashionable streets of London with bare feet, and wearing nothing on his head, he would run considerable risk of being arrested as a lunatic. He might argue in the most rational manner possible, and prove conclusively that boots, shoes, and hats, are injurious to human health; but, in spite of all his arguments, he would probably find himself in an asylum.

Occasionally, even in the highest civilisation, the human foot does exhibit the varied powers of which it is capable. Most persons have heard of the famou[illegible] Antwerp artist who has no hands, but makes a goo[illegible] living by copying the masterpieces of art in that cit[illegible] He holds his brush between his toes, and there a[illegible] few who can use it better with their fingers. I ha[illegible] not seen him, but I have seen his painting a[illegible] writing.

Not long ago I saw, in America, a young girl [illegible] makes similar use of her toes, because, although [illegible] has arms, they are quite useless, and dangle helpl[illegible]

from her shoulders. She can sew, write, and even play the piano with her toes, though a gorilla could not do so with its fingers. Yet, except that her toes have not been crushed together and disfigured by tight boots, there is nothing in the external appearance of her feet to mark their flexibility, and her walk is just like that of any girl of her age.

I was greatly taken with the deft rapidity with which she unscrewed the top of a portable inkstand, holding it with the toes of the left foot, and unscrewing it with those of the right. In arranging her pen she picked it up with the left foot, and then adjusted it between the great and index toe of the right foot.

So, although it would be impossible for man to become civilised without human hands and feet, it does not follow that civilisation is the offspring of the hand, *plus* the foot. They are the means, but not the source, of civilisation. A man may have perfect hands and feet, but if his mind be deranged he will use them against civilisation, while, if his mind be entirely destroyed, as is the case with idiots, he will not be able to employ them at all, and will be as helpless as a baby who has not learned their use.

As means, however, they are absolutely necessary, and therefore I have given a few words to them before entering upon the tools and implements which they not only wield but make.

CHAPTER II.

THE PICKAXE.

Ancient and Modern objects—Their comparative value—The Deer-horn Pickaxe—Definition of a Savage—The Fuegian of the present Day—Lieut. Bove's account—Want of a home—Self-love and isolation—The Bosjesman of the present day—Living from hand to mouth—A Bosjesman visitor—When man ceases to be a savage—A fixed home, and the tools needful for making it—The cave-dwelling—The Australian digging-stick—Its various uses—The primitive pickaxe—The pick-club of Australia—A similar implement of New Caledonia—Their two-fold use—A pickaxe fight.

SUPPOSING that one of the persons who make a scanty living by searching the dust-heaps were to find the object which is represented in the accompanying illustration, he would naturally think that it was the unfinished handle of a hunting-whip, or, perhaps, of an umbrella, and would not treat it with any particular respect. If it were in good condition he might sell it for a few pence, while he could hardly get a single penny for it if it were very old, very cracked, and very battered.

But, supposing the dust-heap to have belonged to some race of man now long extinct, that it has been discovered beneath many feet of earth, and that the explorer should be an archæologist, prosecuting his

researches for the purpose of investigating the history of primitive man, such an object as this would possess the greatest interest, be worthy of respect from its antiquity, and be of considerable pecuniary value as an object for a museum. It would be recognised as a pickaxe made from part of the "beam" and the front antler of a stag's horn, and the very fact that it was much worn away by use would add enormously to its value.

Deer-horn pickaxe.

It is always interesting to compare the weapons and implements of pre-historic man with those of races which still exist, and which we are in the habit of calling savages — a greatly misused word. There are, in fact, very few really savage tribes in existence, if we take the word in its fullest sense. Perhaps the Bosjesmans of Southern Africa, and the Fuegians of South America, are the best existing representatives of true savages. They have neither government nor laws, each family being independent of all the rest of the tribe or nation.

As to the latter race, some very interesting observations have been made by Lieut. Bove. Dress, as a

protection against the climate, is almost unknown. "A few necklaces of shells or birds' bones form the usual dress of a Fuegian. For protection against the terrible hurricanes, and the snows that fall during ten months of the year, and the torrential rains that daily visit this miserable archipelago, the Fuegian only wears a small mantle of seal or guanoco skin over his shoulders."

Their huts are only made of intertwined branches fixed in some sheltered spot, but they are too weak to keep out snow and rain. The natives scarcely ever remain more than one or two days in the same place. They lead a vagrant life in their small canoes among the complicated canals of this broken-up country, fishing and hunting for their subsistence, of which the sea furnishes the larger part. The women are looked upon as slaves, and the greater part of the work falls to their share.

". . . The only lasting love in the Fuegian is the love of self. How often have I seen a father devouring a piece of meat or bread, while his famishing wives and children silently watch him with their hungry eyes, timidly picking up the crumbs that fall from his mouth, and darting ravenously upon the miserable remains thrown to them by the ferocious head of the family.

"As there are no family ties, the word 'authority' is void of meaning among the Fuegians. Every family enjoys the utmost independence, and only the need of common defence induces a few families to form a small tribe. But no one has the right to set himself up as a chief and direct the actions of others.

[redacted]

Offensive expeditions are fixed by common accord, and the products of the chase are equally distributed among those who have taken part in it."

Very similar in their habits, though the denizens of a hot instead of a cold climate, are the Bosjesmans. The family—which is never a large one—is the only form of government, while each man is a law unto himself. Like the Fuegian, he has no fixed home. He cultivates no ground, he never even thinks of setting aside a provision for the morrow, and depends for his daily food upon his daily prowess in hunting.

Compare with this narrative, Dr. Lichtenstein's graphic description of an old Bosjesman.

"One of our present guests, who appeared about fifty years of age, had grey hair and a bristly beard; his forehead, nose, cheeks, and chin were all smeared over with black grease, leaving only a white circle round the eye, washed clean with the tears occasioned by smoking. This man had the true physiognomy of the small blue ape of Kaffraria.

"What gave the more verity to such a comparison was the vivacity of his eyes, and the flexibility of his eyebrows, which he worked up and down with every change of countenance. Even his nostrils and the corners of his mouth, even his very ears, moved involuntarily, expressing his hasty transitions from eager desire to watchful distrust. There was not, on the contrary, a single feature in his countenance that evinced a consciousness of mental powers, or anything that denoted emotion of the mind of a milder character than belongs to man in his mere animal nature.

"When a piece of meat was given him, he stretched out a distrustful arm, snatched it hastily, and immediately stuck it into the fire, peering around with his little keen eyes, as if fearful lest some one should take it away again. All this was done with such looks and gestures, that any one must have been ready to swear that he had taken the example of them entirely from the ape.

"He soon took the meat from the embers, wiped it hastily upon his left arm, and tore out with his teeth large, half-raw bits, which I could see going entire down his meagre throat. At length, when he came to the bones and sinew, as he could not manage these with his teeth, he had recourse to a knife which was hanging round his neck, and with this he cut off the piece which he held in his teeth close to the mouth without touching his nose or eyes—a feat of dexterity which a person with a Celtic countenance could not easily have performed.

"When the bone was picked clean, he stuck it again into the fire, and, after beating it between two stones, sucked out the marrow. This done, he immediately filled the empty bone with tobacco. I offered him a clay pipe, which he declined, and taking the thick bone a long way into his mouth, he drew in the smoke by long draughts, his eyes sparkling like those of a person who, with more than usual pleasure, drinks a glass of costly wine."

Here is the savage pure and simple, the lowest imaginable point of the human race, and yet how infinitely above the highest ape! No ape would have carried a knife, or been able to use it, or would have

[redacted]

needed an artificial pouch. No ape could even have conceived the idea of cooking its food by means of fire. Still less could it have broken the bones in order to get at the marrow, and even still less could it have invented a primitive pipe, filled it with tobacco, lighted it, and enjoyed the smoke. Beings who can perform these various acts bear not even the most distant relationship to apes, but are men.

Men such as these require no tools except those which may be extemporised out of a flint, or a pebble, or a stick. They need weapons wherewith to kill the beasts, birds, and fishes on which they live. But, as they till no ground, and build no houses, they need no tools.

But, when we come to races which possess settled residences, no matter how mean, who till the ground, no matter how rudely, and are guided by common laws, no matter how imperfect, we have no right to call them savages. They have begun to think for the morrow, and so far to live for the future, and not only for the present hour. They have risen above the level of the savage, and are entitled to take rank, low though it may be, among civilised beings.

THE first step towards civilisation is evidently a fixed residence, and the first and most obvious residence is a cavern of some sort.

It is not likely, however, that a cavern would fulfil all the needs of the intending inhabitants without alteration. It probably would not be lofty enough for them, and, as they increased in numbers it

certainly would not be large enough for them. Not being supplied, like the fox, badger, rabbit, and other burrowing animals, with digging claws, they must have recourse to tools. The tools which are absolutely needful for this purpose are the pick and the crowbar, and we may naturally expect to find them both, or at least their marks, in the most primitive form.

The primary digging implement was evidently a pointed stick, with the end probably hardened by fire. Such an implement, called a "katta," is still in use among the natives of Australia, and seems to be spread among all the inhabited parts of that great country. It does not look much of an implement, but the amount and variety of work which a native will do with it must be seen to be appreciated.

Give one of our most stalwart "navvies" a pick, crowbar, and shovel. Give a native Australian his pointed stick, and set them to digging out a burrowing animal from its hiding-place, and the navvy will be nowhere in the contest. The latter makes the hole of considerable width, so as to allow free scope for the shovel and pickaxe. But the former only needs to make a hole just wide enough to allow him to stoop and pick up the loosened earth with his hands.

Even the Porcupine Echidna, which can burrow as fast as our mole does, is forced to succumb to the digging-stick of the Australian.

Having ascertained that the animal is at home, the man pushes a long and flexible stick into the hole, and so ascertains the position of the inmate. With

the katta he sinks a perpendicular shaft upon the hiding-place of his quarry.

The Echidna, however, has no idea of sitting still to be captured, and as soon as it finds itself in danger, begins to extend its burrow. Another shaft is then sunk, and so at last the animal is tired out and is captured by its indefatigable pursuer.

Not only is the katta used for the purpose of digging holes in the ground. It is also employed for a directly opposite purpose, *i.e.*, to enable its possessor to ascend trees. No tree trunk, however large or smooth, can baffle an Australian native. He prefers a tomahawk for this purpose, but if he has not one at hand, he can make a small katta or "warpoo" in a few minutes, and with its aid will ascend the tree.

With the sharpened end of the stick he punches holes in the tree as high as he can reach. These holes are arranged in two rows, about eighteen inches apart, and are just deep enough to receive the end of the great toe.

Australian digging-stick.

Inserting his fingers into the holes above, and his toes into those below, the man makes a few steps upwards, and then punches more holes. In this way he will ascend a tree with wonderful rapidity. Occasionally, when he wants a short rest, he drives

the warpoo well into the tree, and holds on by it as if it were a handle.

Beside its use as an implement, the warpoo can be employed as a weapon, and, at close quarters, acts as a very effective dagger.

For more extended operations a more elaborate implement is required, and, as I have already mentioned, is found almost to hand in the deer-horn. There is no difficulty in obtaining a plentiful supply of such rude pickaxes, because the deer shed their horns annually, and so there is no necessity to kill a deer when a pickaxe is wanted.

Australian clubs or picks.

A similar form is made of wood, and is still employed among several savage or semi-savage nations. The Australians, for example, still use the implement which is here figured, and which can be used either as a club or a pick. It is made of the heavy gum-tree wood, and its peculiar curve is obtained by cutting it from an elbowed branch, so as to follow the natural grain of the wood.

An almost identical form of club-pick is found in New Caledonia, and is figured in the accompanying

illustration. The wood of which this implement is made is of a lighter colour than that of the Australian gum-tree, which becomes blackish-brown by age, and being of a very close grain takes a higher polish.

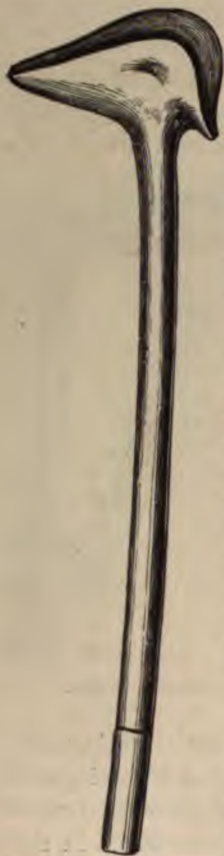
The New Caledonian, indeed, is, in many respects, a far superior race to the Australian. The islands which bear the name of New Caledonia are nearly a thousand miles east of Australia, but, although now so far separated, may at one time have formed part of the mainland, just as Great Britain was at one time a peninsula of Europe, and not a group of islands.

New Caledonian pick or club.

This theory may account for the curious similarity in the form of the club-pick, and, moreover, for the fact that both races use supplementary means for throwing their spears, the Australians employing a throwing-stick and the New Caledonians a throwing-cord. Both of these implements will be figured and noticed in their place.

In order to show the manner in which weapons and implements are gradually modified in form, I here insert a figure of a club-pick which was for many

years in my collection. I am inclined to think that it was then just completed, much of the same form as that shown in the previous figure, but that it had been either broken or worn away, and, therefore, remodelled in form.


Club pick, New Caledonia.

I shall again refer to this kind of instrument when we come to its use in agriculture.

Employed as a weapon, it must be a very effective one, the point coming over the shield of the adversary. It cannot, however, admit of much dexterity in use, on account of its badly distributed weight, and two combatants armed with this weapon would reproduce the celebrated fatal pickaxe fight between two English navvies, as narrated by another navvy, who was one of the spectators of the affray.

"He picked he wi' his pick, and *he* picked he wi' *his* pick, and if he had picked he wi' his pick as hard as *he* picked he wi' *his* pick, he would ha' killed he, and not he he."

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CHAPTER III.

CAVERN LIFE.

The Cave as a primitive home—Duration of natural caverns—Their gradual obliteration—Means of their destruction—Heat and Cold—The power of Ice—Ice *versus* Gunpowder—Man and Time—Equality of small and great things—Nature's obliterating power—The ruins of Nineveh—Cedar and vermilion—A new buried city—Dr. Schliemann; three cities of Troy—Mechanical power of moving ice—The glacier and its tracks—A huge boulder—Artificial caves—The "Deneholes" of Kent and Essex—Mr. F. C. J. Spurrell's investigations—Geological position of Deneholes—Principle on which they were excavated—Mode of ascent and descent.

HAVING only these very primitive implements, our predecessors—I cannot say ancestors—could not be expected to carry out any operations of large extent, or requiring delicacy of execution; yet, poor as were their tools, they contrived to produce work which might have been old when the pyramids were built, and which is still in nearly as good condition as when the workmen laid aside their deer-horn pickaxes and sharpened stakes.

It is very seldom that we of the present day have the opportunity of seeing the veritable handiwork of pre-historic man. We possess many examples of their rude tools and implements, but, with very fe

exceptions, we have seen nothing of the work which was done with them.

Of man himself scarcely a relic is to be found, and even the caves, which naturally formed the most easily attainable dwelling, are slowly but surely being filled up in one way or another. Sometimes the roof falls in, leaving a pit on the surface of the ground, instead of a cave below it, while a multitude of other causes tend, first, to alterations in the cave, and, lastly, to its destruction.

Professor W. Boyd Dawkins, who has made "cave-hunting" his special study, states that he only knows of two caverns that can be said to be as old as the Middle Pliocene. In all the vast and indefinite epochs, to which we give conventional and probably temporary names, such as Eocene, Miocene, Pliocene, and so forth, caverns have existed, but they have all been successively obliterated "by rain, the alternations of heat and cold, the acids evolved from decaying vegetation, and the breakers on the sea shore."

The mechanical effects of rain, aided by the chemical effects of its constituents, are evident enough, and there is no observant person who has reached middle age who cannot call to mind certain changes in the earth's surface which have been caused by rain alone.

The effects of alternate heat and cold, although slower in their action, are even more powerful. Taking our own little island as an example, every schoolboy—at least, if he be a Board schoolboy—knows that at one remote period of time England

was a tropical country, with the luxuriant vegetation and abundant animal productions which are now to be found in those parts of the earth where the Tropics are at present.

He also knows that at another remote period of time England possessed a temperature like that of the Arctic regions, and that in places where the corn waves its yellow ears, the forests are bright with foliage, or where the millions of men are congregated in vast cities, "thick-ribbed ice" covered the earth in solid plains, or slowly ground its way along in the form of glaciers.

Besides the resistless force of the moving ice torrent, there is the expansile power of water when converted into ice. A very common example of this power is to be found in the freezing of narrow-necked water caraffes on a cold night, or the more troublesome bursting of water-pipes during a frost, and the consequent deluging of the house when the warmer weather sets in.

As to the power of ice upon the earth, a very good instance is given by Mr. H. C. Barkley in his graphic work, "Between the Danube and the Black Sea."

Mr. Barkley, a civil engineer, was laying out a railway, and had to make a cutting through an old Roman wall near the Bay of Kustendjie. Like all Roman work, it was so solid that when the navvies began to break it down they found that the mortar was actually harder than the stone, and that they would be obliged to blast it with gunpowder. One of the workmen, with more zeal than discretion, had

driven a tunnel under it, without orders from the foreman, who was a man named Striver. He was a native of Durham, and had been bred among coal-mines, so that he was invaluable as a subordinate.

"Our trouble with the great bar of masonry was not by any means over, for though there was a road under it, we dared not use it, and the wall was far too hard to break up as it was.

"We drilled a hole in the centre, and put in a heavy charge of powder (all we could buy in the town); but, owing to the innumerable cracks and fissures, this, when fired, squandered its force, and only enlarged the drill-hole to about a foot in diameter.

"Now, a bright thought struck Jack Striver. He plastered round the hole with mud, and the last thing at night he filled it with water, which the very severe frost turned to solid ice. The expansion in freezing cracked the entire mass, and in the morning we found it in pieces at the bottom of the cutting."

Here, then, on a small scale is an example of the work which, on a much vaster scale, both of area and time, is incessantly going on upon the crust of the earth. Among the many agents which help in filling up the caves, not the least powerful is ice, which breaks up the roofs of caves and causes them to fall in fragments on the floor, just as Jack Striver's ice broke up the masonry which defied the pickaxe, crowbar, and even gunpowder, and left the old wall in fragments on the floor of the cutting that had been made under it.

The operation of Nature is slower than that of man, and for a very simple reason. Man "hath but a short time to live," and is but the creature of a day, so that he is obliged to hurry his work if he wants to reap the benefit of it.

But, as P. J. Bailey remarks in his "Festus,"—

"God worketh slowly, and a thousand years
He takes to lift his hand off."

Whether the work be done on a larger or lesser scale matters nothing, and, indeed, the student of Nature very soon learns to disregard magnitude of bulk or duration of time when compared with the universe and eternity. He realises the words of the poet whom I have already quoted:—

"Nought is great
Nor small with God—for none but He can make
The atom indivisible, and none
But He can make a world. He counts the orbs,
He counts the atoms of the universe,
And makes both equal—both are infinite."

Even within the comparatively narrow limits of historic times, Nature has largely succeeded in obliterating not only the works of man, but even the remembrance of them. Nothing was known of those vast and now familiar winged bulls which were discovered by Layard in the sands at buried Nineveh. None of the prophets foretold the absolute erasure of Nineveh from the face of the earth. They foretold destruction and desolation, but it was not made known even to them that the greatest city of the earth, the mistress of the known world, would vanish so

entirely that all relics of it would have to be sought deep below the desert sands. The carved work of stone, the cedar beams and vestiges of the vermilion paint, which are mentioned by the prophets, still remain as proofs of the truth of the Sacred Narrative. But, they were, exactly as foretold, destroyed by the victorious enemy. They were burned and desolated with fire. They were deserted by man and left to the wild beasts. By degrees the earth took possession of her own. The sand drifted into the ruined chambers and filled them, so that even the wild beasts could find no shelter, and at last the sand overwhelmed them entirely, and blotted them not only from the eyes, but even from the memory of man.

Only lately, excavations were made around the Great Sphinx. The base of the figure was reached, and proved to be very much as anticipated. But at the distance of a few hundred yards were discovered the remains of gigantic architecture that had been buried under the sand for unknown centuries, and their presence not even suspected.

Not to multiply similar examples, such as the familiar cities of Pompeii and Herculaneum, I will only mention Dr. Schliemann's wonderful excavations in search of the historic, but almost mythical Troy of Homer. He not only discovered it, together with a large chest full of golden vessels and ornaments, but found that there had existed no less than three successive cities of Troy on the same site, the first and second having been built upon the ground that covered the roofs of their predecessors.

As to Ice, we can form some idea of its me-

chanical power by reflecting that for a long series of ages the whole of Northern Europe, including the North and Baltic seas, was covered with a sheet of solid ice, varying from a thousand to two thousand feet in thickness, and that even Southern Europe was no warmer than Greenland is at the present day.

North America was similarly coated with ice, glaciers descending as far southwards as North Carolina. Evidence of these gigantic ice-continents —for they really deserve that name—are plentiful even in our own country, where large boulders of stone have been carried by the ice far from their original bed, and have been dropped here and there, giving rise to countless local legends.

One very remarkable example of such a boulder exists in the State of Maine, U.S.A. It is popularly called the Mammoth Rock, and is a great attraction to visitors.

At the base it measures four hundred feet in circumference, and its longer diameter is one hundred and twenty-five feet, the height being fifty feet.

A photograph now before me gives a good idea of its gigantic dimensions. A horse and four-wheeled "buggy" are on one side of it, looking as if they were made for a doll's house. A lady in a white dress is leaning against it on the other, and a gentleman, who is diminished to a veritable pigmy, has managed to perch himself on the top.

On looking at this photograph, it is easy to form some idea of the tremendous ice-sheet which bore it far away, and when the glacial epoch began to change again to the tropical, dissolved under the warmer

influences, and deposited its burden on the spot where it now rests.

Here I may make a casual remark about the popular name of this enormous boulder. By a curious perversion of language, the whole is considered as expressing a portion, and the word "rock" is familiarly employed as signifying a stone. An English boy throws a stone, but his American representative "heaves a rock." Size has nothing to do with the subject, and though the stone be no bigger than a pea, it still goes by the popular name of "rock."

Add to these agencies the fact that all the known land has been more than once submerged beneath the sea, and upheaved above it, the wonder is, not that so few relics of man can be found, but that there are any at all.

Professor E. S. Morse states his opinion that if any relics should exist of man in the tertiaries, they must be buried beneath the ice-fields of polar regions.

After mentioning that all along the coast of New England, "shell-heaps are everywhere met with, cropping out and crumbling down with the decaying banks, so that the records of man thus lost can never be regained," he proceeds as follows :—

"Chief among the agencies in destroying the evidences of man have been the glacial floods, and these, if the glacialists be right, have occurred, one during the earlier pliocene, and the other at the beginning of the quaternary.

"To those overwhelming and annihilating ice-torrents, grinding, sweeping, and inundating the north

temperate zone, must be attributed the almost complete obliteration of records which we hold most precious. And, in their gradual recedence, no less destructive agencies were at work in scooping out valleys, inundating immense areas, and covering broad tracts of land by their detritus.

"Even man to-day, with his colossal works of engineering skill, would, in the face of a glacial flood, yield the last traces of the evidences of his existence. A few corroded boulders of metal and bits of glazed pottery alone might survive. What must such a torrent have been to primitive man with his simple rude appliances!"

Seeing, then, how frail is the tenure of existence possessed by any cave, and how many agencies seem to be leagued against it, we ought to think ourselves specially fortunate when we come across a cave in a good state of preservation. Still more fortunate are we when the cave has not been formed by the ordinary forces of nature, but has been hollowed out by the hand of pre-historic man, and furnishes us with relics of himself.

In several parts of Kent and southern Essex there have been many such caves, known popularly as "Dene-holes," or "Dane-holes," or "Den-holes."

Most of them have fallen in so completely that their position is marked by a large, shallow crater. These have evidently succumbed to the disintegrating effects of rain and alternate heat and cold.

Some have been artificially filled in for the sake of safety, and several of these are peculiarly valuable, a
bearing records of various successive ages of hum

life. A group of those holes, situated in the Crayford brick-fields, has been examined by Mr. Flaxman C. J. Spurrell, who has given much time and trouble to his archæological investigations, and two of them will be presently mentioned.

None of them are in the condition in which they were left by the excavators, but some are in a wonderful state of preservation, and are invaluable as affording accounts of very primitive man.

They are invariably excavated in chalk, and their depth depends upon the distance of the chalk from the surface of the ground. The principle of construction, or rather of excavation, is the same in all, though there are no two which are exactly alike in detail.

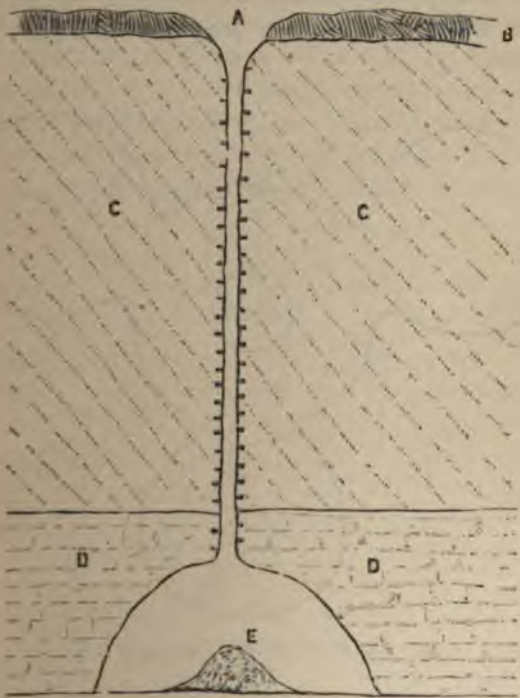
In shape, the typical Dene-hole very much resembles an ordinary water-bottle, with a neck more or less elongated. The neck, or shaft, is about three feet in diameter, and is driven downwards until it reaches the chalk, which it penetrates to a depth of twelve to twenty feet—in some cases even deeper.

Then it is scooped at the bottom into a more or less spherical chamber, leaving a chalk roof of at least two feet in thickness. In those cases where the roof has been left too thin, it has always broken down, allowing a quantity of earth to fall through the gap, so that the heap of *débris* has partially filled up the chamber.

Access to the chamber is obtained by means of little foot-holes cut in opposite sides of the shaft. They seldom are cut in a straight line, usually taking a slight spiral curve of about a third of a circle. I have

descended and ascended two of these shafts, one being seventy-five feet, and the other eighty-three feet in depth, by means of the foot-holes.

As some of the earth has fallen in from above, so



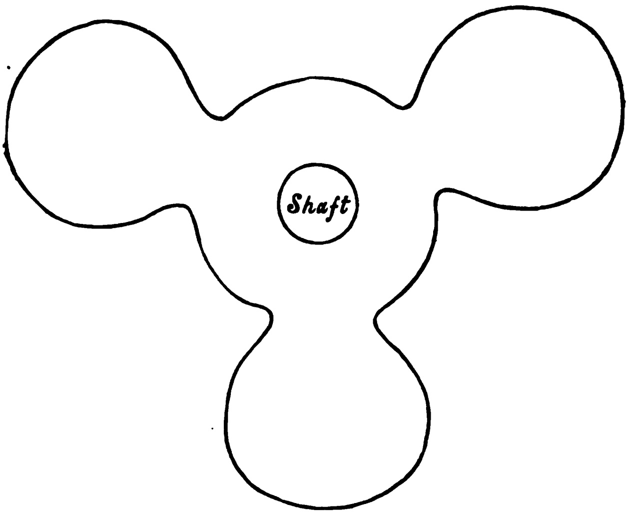
Ordinary Dene-hole.

as to make the opening funnel-shaped, it is necessary to have a rope by which to hold until the foot-holes are reached, as also to enable the explorer to make his way out again. Moreover, when he has reached

the bottom of the pit, and wishes to re-ascend, he must climb a few feet hand over hand in order to enable him to reach the first foot-holes.

On page 39 is a section, accompanied by a ground plan, of a typical Dene-hole.

But many of these pits are much more elaborate in form.



Plan of 3-chambered Dene-hole.

After the original chamber was hollowed out, several other chambers were scooped at the sides, so as to give the ground-plan either a trefoil or quatrefoil appearance, according to the number of chambers. Then passages were cut through the walls which separated the chambers, enough of the

chalk being left to serve as pillars by which the roof is upheld.

In order to show this mode of construction more clearly, I give a plan of a Dene-hole in its three-chambered or trefoil state. The reader will at once see how, by enlargement of the chambers, mere walls would be left between them. These would then be pierced so as to make arched passages from one chamber to another, and so, by continually scooping out new chambers and cutting passages between them, a very complicated structure could be made.

CHAPTER IV.

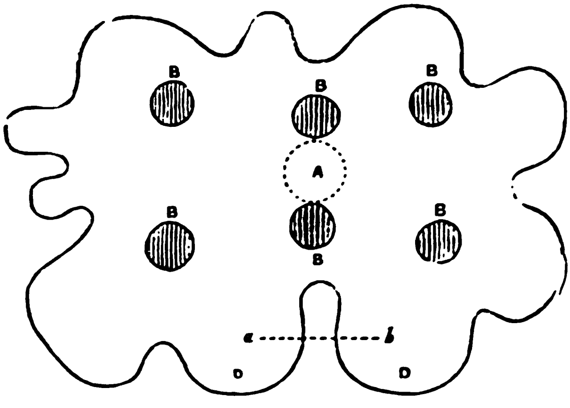
CAVERN LIFE. CONCLUDED.

A six-pillared and many-chambered Dene-hole—Height of the chambers—Its contemplated enlargement—Groups of Dene-holes and accompanying wells—Surrounding earthworks—Conjectured date and uses of Dene-holes—Their greatest known depth—An adventure in a Dene-hole—Dangers of Dene-holes—Neolithic remains in a Crayford Dene-hole—Roman housemaids—Proofs of cannibalism—Human bones charred and split—Dene-holes used as granaries—Origin of "ensilage"—Brick-lined silos—Their value in time of war—Position of silos—How discovered—Silos used as hiding-places in danger—The "storehouses" of the Scriptures—Ishmael's treachery—Ransom of captives—Earth a natural hiding-place—Concealed hoards—The French peasantry—Treasure-seeking in the East—A universal superstition—Hopes for the future.

IN one of these pits there have, originally, been six pillars, but, unfortunately, two of them have been removed, and, in consequence, the roof on that side has fallen in, and half of the chamber has been nearly filled up with chalk and earth. The total length of this chamber is about fifty feet, its breadth thirty-eight feet, and its height about twenty-five feet. On either side of the shaft a pillar is retained, and, as the foot-holes are continued on the pillars, ascent and descent are comparatively easy.

[redacted]

The excavators of this fine specimen of pre-historic workmanship had evidently contemplated still further enlargement, by means of additional chambers at the sides, some of which had been pushed on to some extent. In order to give a general idea of this cave, as it was when the excavators left it, I give a ground-plan of it. The plan on which this figure is based may be found in Mr. F. C. J. Spurrell's interesting paper in the *Archæological Journal,* where



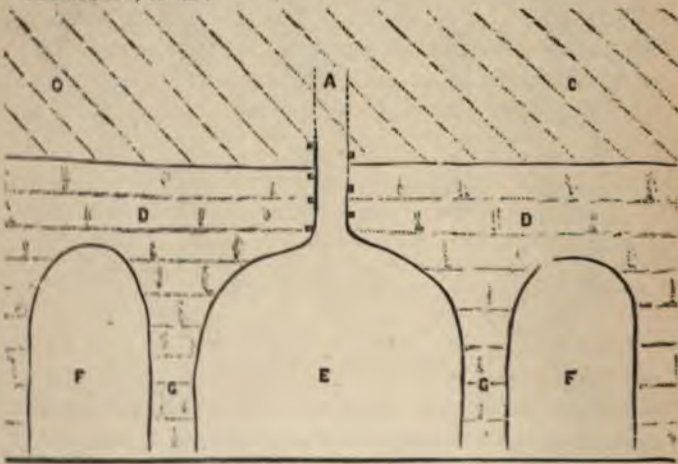
Plan of large Dene-hole.

also may be seen a drawing of the interior of the cave, showing its singularly picturesque appearance, and the bold effects of light and shade upon the roof, arches, pillars, and chambers.

Originally, six pillars had been formed, but the two on the left hand had been removed. The chalk roof of so large a chamber was not thick enough to bear the weight of the comparatively loose superincumbent earth, and, in consequence, the chamber is now so

filled with fallen chalk and sand, that to take an accurate plan of it was a task of much difficulty.

That the cavern was intended to be much larger is shown by the contour of the outline. A represents the single central shaft. B B are the pillars, the positions of which were evidently marked out with considerable skill. The place of another pillar is evidently at C, its object being to support the roof of the large chamber, which would be made by cutting away the separating wall between the two chambers, D D.



Section of chambered Dene-hole.

A similar enlargement was in hand towards the left of the excavations, and, in all probability, a corresponding pillar to C would have been made on the opposite side of the chamber; so that there would have been four pillars in a single row in each direction.

[redacted]

These remarkable pits are seldom isolated, but occur in groups, fifty or sixty being set closely together—so closely, indeed, that an explorer in one pit can hear the sound of blows struck upon the side of the pit nearest to it. Yet, with all the capabilities of extension which these pits possess, I believe that there is no case where two have interfered with each other, so that no shaft is connected with any chamber except its own. Each group is generally accompanied by several wells of very great depth.

In several cases, each group of pits is protected by a fairly-designed series of earthworks and ditches, so that a man could easily creep from one to another without being seen on the outside.

The state of preservation in which some of these pits are found is really wonderful, the marks of the deer-horn pickaxe being as sharp and fresh as when its owner struck the blow. If there could have been any doubt as to the character of the tools which were employed, it would have been set at rest by the discovery of those very tools.

The date of the origin of these caves is, of course, exceedingly doubtful, but it is evident that the excavation of some of them must have extended through very wide epochs.

That they were earlier than the Neolithic Age is not very likely; but, as tools of flint, stone, bone, deer-horn, bronze, and iron have been found in them, it is evident that the work of excavation must have been a very long one, and that successive generations of inhabitants must have carried on the labours of their predecessors. This opinion is strengthened by

the fact that metal tools were always found in the largest caves.

I believe that few, if any, known Dene-holes reach the depth of one hundred and fifty feet, though several are known which fall little short of this measurement. One of these, which is one hundred and forty feet deep, is at Eltham, on Mr. Jackson's property. Contrary to usual custom, the cave has only been made at one side of the shaft. Thus, if a curtain were hung over the opening, it would be perfectly possible for refugees even to burn lights in the chamber without being discovered by persons who might happen to look down the shaft. Indeed, in the stormy times of the fifteenth and sixteenth centuries, the cave was actually used as a place of refuge, the iron pegs on which the curtains were hung being still visible.

I have mentioned that many of these Dene-holes have been filled up intentionally. The reason is simple enough. The days pass away when such habitations are needed, their exact locality becomes uncertain among the shrubs and trees which spring up around and among them, until, at last, they are almost wholly forgotten. Then they become sources of danger, and dogs, sheep, and sometimes human beings, fall into them.

Mr. Spurrell tells an amusing story of a man who fell into one of these pits. He was only stunned, no bones were broken, and when he recovered he tried to find some way of escape. At last he groped his way into a dark passage, and, after crawling along it for some miles, he found an opening to the daylight.

His cries for help were heard, and when he was drawn from the pit, he described the long and mysterious passage through which he had made his way. In fact, he had been incessantly creeping, in the dark, round the pillars, and up and down the banks of *débris* of the pit into which he had fallen. But no one could persuade him that there was no subterranean passage, and no persuasion could induce him to be let down again into the cave and see for himself.

While I was visiting the Bexley pits, I was a witness of their dangerous character. One of the party possessed a dog—an *alter ego*,—from whom he could seldom bring himself to part. Those who knew both were accustomed to say that the dog was the master, and owned the man.

When the expedition was projected, Mr. X. was warned not to bring his dog, because of the dangers of the place, and, moreover, because the dog invariably got himself and his master into trouble by his eccentric ways. However, he insisted on bringing the dog, or, rather, the dog insisted on joining the expedition; and, sure enough, just before we were about to start homewards, there was an outcry that the dog was missing. Then followed a long search among the numerous pits of Jordan's Wood, and at last the animal was discovered at the bottom of one of the pits exactly as had been foretold.

Not many years ago, the public was startled by the sudden appearance of wells in the streets and gardens belonging to dwelling-houses in several parts of Kent. One fatal accident occurred, the so-called well having fallen in just as a woman was passing over it. The

filling in of such pits is, therefore, a necessary precaution where human habitations are erected near them.

Now, supposing a pit to have been thus filled up, subsidence of the loose material, in a greater or lesser degree, is sure to occur, and then the filling has to be renewed. In one of the pits discovered by Mr. F. C. J. Spurrell, at Crayford brick-fields, and examined by him, a remarkable series of repeated fillings exists.

The pit is not a very large one, being only thirty-seven feet in depth. It has been sunk through the chalk until it reached a thin layer of flint. At the bottom of the pit is a heap of materials, mixed with the usual flint-flakes of the Neolithic period, together with a "core" belonging to a flint after the flakes have been removed. Above this heap is a layer composed almost entirely of Roman pottery, bits of Samian ware, and so forth, while the rest of the pit is filled with rubbish of past Roman times.

It is evident, therefore, that the Romans found these pits to be convenient receptacles for the remains of crockery-ware, which seems to have been as liable to "come in two" in the hands of Roman housemaids as of those of their English successors. After the Romans had abandoned England, the pits were evidently thought to be dangerous, and were filled in with ordinary rubble. Had it not been for this filling up of the pit, the Neolithic relics would undoubtedly have been removed, as has been the case with most of these caves, and so we should have lost our best proofs of the antiquity of the excavations.

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Some of the flint flakes which have been discovered within these remarkable excavations are covered with the peculiar white deposit which shows extreme age in flints, just as the precious "patina" of coins, which no forger has yet been able to reproduce so as to deceive a skilled eye, affords a proof that the coin is a genuine one and not a clever imitation. Even "Flint Jack," with all his wonderful skill, never could coat the surface of one of his forged implements with the deposit that is the result of countless ages.

Human bones have also been found in several Dene-holes.

These bones tell a story of their own. They are not the remains of the honoured dead, which have been laid in the earth as the bodies of the patriarchs were laid in the cave of Makpelah. Nor were the flint-flakes and other implements, which were found near and among the bones, laid in the tomb for the purpose of aiding the dead in the spirit world, just as the North American Indians place in the tomb of a warrior his weapons of war, and slay his favourite horse to bear his master in the land of spirits.

Marks of fire are visible upon the bones, but the flame which charred them was not that of the funeral pyre. The bones have been split longitudinally, showing that they have been skilfully broken for the purpose of extracting the marrow. So, it is only too clear that the former inhabitants of the Dene-holes were not only savages, but cannibal savages; that the bodies of the dead had been cooked; that the flint knife-flakes had been used for the purpose of separating the flesh from the bones; and, lastly, that the

bones themselves had been first roasted, and then broken for the sake of the marrow within them, just as has been narrated of the Bosjesman in Chapter II., page 21.

Whose bodies furnished the cannibal feast we cannot definitely ascertain; but, judging from the habits of cannibal savages who carry on their man-eating customs at the present day, we may offer a tolerably safe conjecture in pronouncing the charred and fractured bones to have belonged to slain enemies.

Although these large and elaborately-designed pits were intended for human habitations, there are many which are far too small for such a purpose, and evidently belonged to a later and more advanced race. They almost exactly resemble the "silos," or grain-pits, which are so common in the East, and the name of which has lately become familiar under the title of "ensilage," in preserving green fodder in pits instead of drying it into hay.

In their earliest form, these grain-pits are simply sunk in the chalk, and, as a matter of course, are confined to those places where the chalk lies near the surface, so that a deep shaft is not required.

Afterwards, when the value of earthenware, however rude, began to be known, the grain-pits were dug in almost any kind of soil, and, being carefully lined with clay, and a fire kindled in them until the clay was converted into a sort of brick, the makers were independent of chalk, and could dig their granaries wherever they happened to fix their habitations.

One great convenience of these chambers lay in the ease with which they could be concealed from robbers, and could even defy the enemy in time of war. They were seldom more than seven or eight feet in depth, and the opening was not more than fifteen or sixteen inches in diameter—almost exactly like those of the East at the present day.

It was perfectly easy, therefore, to have several of these treasure-houses dug in out-of-the-way spots, known only to the owners. On the first news of danger, these reserved pits would be filled up with dry earth, and the small opening could be so covered with soil that no sign was left of its presence. Then, the women and children being sent away, the warriors would fight, and, if possible, drive away the enemy. Should they be overpowered, they would make their escape into their fastnesses, and, on their return, after the departure of the enemy, would be sure of a supply of food.

Canon Tristram, in his "Natural History of the Bible," gives a very interesting account of these hidden treasure-chambers.

"Generally, owing to the insecure state of the country, these store-houses are made under the house, especially under the most retired portion, the apartments of the women.

"In an Arab village, the store-houses are often in the centre of the village square for the barley; for the wheat, and other more precious stores, under the chambers. Thus, we once saw, on entering a village which had been recently sacked, the mouths of these dry wells opened and plundered.

"The Arabs who were with us, scenting the booty, soon discovered others, neatly concealed, by sounding the surface, and then rushed into the houses, where, under the inner chambers, they found the secret stores which the robbers had not had time to explore, and from which they brought out a rich booty of indigo, meat, and other valuable treasures."

The same writer points out that when Rechab and Baanah conspired to murder Ish-bosheth, as is told in 2 Sam. iv. 6, they went into the interior chamber of the house "as if to fetch wheat" from the concealed grain-pit. He also refers to the episode in Absalom's rebellion, where Jonathan and Ahimaaz were fleeing for their lives, and were detected by a lad, who betrayed them to Absalom. "But they went both of them away quickly, and came to a man's house in Bahurim, which had a well in his court; whither they went down. And the woman took and spread a covering over the well's mouth, and spread ground corn thereon; and the thing was not known." (2 Sam. xvii. 18, 19.)

This so-called "well" was evidently a grain-pit, and it has been conjectured that the pit in which Joseph was imprisoned by his brothers was one of these granaries. Owing to the peculiar form, it would be impossible for any one to escape unless assisted by some one above. This conjecture is strengthened by the fact that even at the present time pits of this kind are plentiful in the neighbourhood of Dothan.

Canon Tristram states that he found many of them near deserted cities in Southern Judah, and also on Mount Carmel, where the remains of a disused wine-

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press were generally found close to the pits. Such store-houses are, as he conjectures, those which are mentioned in Jer. xli. 8. In some respects the story has its counterpart in many a narrative of Oriental treachery.

Ishmael, the son of Nethaniah, had visited Gedaliah, and had feasted with him in token of friendship. In defiance of the Eastern custom of hospitality, which compels even the most rancorous enemies to become friends if they eat together, he assassinated his host and the friends who were with him.

Then, with equal treachery, he murdered seventy men who were on their way to make offerings at the house of the Lord. Eighty had been doomed to death, but ten purchased their lives by betraying the position of their treasure-houses.

"But ten men were found among them that said unto Ishmael, Slay us not: for we have treasures *in the field* of wheat, and of barley, and of oil, and of honey. So he forbare, and slew them not among their brethren."

This passage would be quite unintelligible if we were not acquainted with the Eastern custom of concealing treasure.

It would have been easy enough to find the wheat, and barley, and olives, if they had been merely crops which had not been removed from the field. But, if they were buried, as has been described, the keenest eye could not discover the hidden treasures. In the case of the village mentioned by Dr. Tristram, the Arabs discovered the position of the pits by sounding the earth. This plan,

however, would be useless in the case of these reserve-pits, which ransomed the lives of their owners.

Those of the village were dug inside the houses, so that their locality was approximately indicated. Moreover, as they were evidently not reserve-pits, but store-houses in regular use, they were partly hollow, so that their presence was discovered by the sound of the blows that were struck above them. But the reserve-pits are entirely filled up with earth, so that no hollow space is left. Consequently, a robber might strike the ground immediately above one of these pits without discovering any difference in sound.

The earth, in fact, affords a natural hiding-place for treasure of many descriptions, particularly if, like coins and jewels, it is little affected by damp. Even in our own little country, which has been so mercilessly subjected to spade and plough, such deposits are still frequently found.

In the French provinces, the thrifty peasant-farmers are in the habit of burying their savings; and the reader may remember that the compensation money demanded by Germany after the war was at once furnished by these hoarded savings, and, if necessary, could have been paid three times over. There is no doubt that vast accumulations of a similar character are still below the surface of the earth, the owners having died and left no record of their hidden treasures.

In the East, the custom of hiding money in the earth is even more prevalent, and is mentioned by Our Lord in his parable of the man who finds a treasure in a field, and at once sells all that he has so

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as to buy the field. There are very good reasons for burying money in that country. In the first place, the owner has no other means of ensuring its safety. There are no stocks, guaranteed by the Government, in which he can place it at interest. There are no bankers in whose hands it would be safe.

Moreover, owing to the dishonest way in which the Government is carried on, no one, except he be an official, dares to show that he possesses money. The tax-gatherer would be sure to assume that he must have at least three times as much as he acknowledges, and would assess him accordingly. So, all the man can do is to hide his money in some secret spot, and occasionally allow himself the pleasure of looking at it.

In consequence of this custom, archæologists find the greatest difficulty in prosecuting their researches in Eastern countries, as it is impossible to persuade an Oriental that any one can have any object in digging except to search for hidden treasure. Europeans find another impediment in the fact that they are supposed to be possessed of magical arts, by which they not only discover hidden treasures, but drive away the demons by whom they are guarded.

I had scarcely written these words, when I happened to take up a copy of the *Globe* newspaper, which afforded a remarkable instance of the difficulties which beset archæologists in the East.

"TREASURE HUNTING.—'At Sioux,' says M. Maspero, in his last account of his researches in Egypt, 'there was a grand row over one of the explorations made by order, or at least by permission, of the

archæological authorities. In this part of the world a high, and, as it would seem, a not unmerited reputation is enjoyed by the Algerian and Tunisian sorcerers, who profess to be able to find by divination the hiding-place of buried treasures. Two of these worthies had persuaded a couple of Greeks that there were some valuable antiquities buried under the cemetery of Drongah.

"'Permission was accordingly given to make excavations at the spot, under the direction of a person representing the museum. At a depth of about 20 feet the hard rock was reached, and 25 feet further down a block of stone gave way, for all the world as such blocks give way in the "Arabian Nights," and the diggers fell headlong into a roughly-hewn square chamber below. In this were found several relics of no very great value, and a few rolls of thin gold-leaf.

"'But as soon as the news of the discovery was known to the inhabitants of the place, who had collected in large numbers at the top of the digging, they were for laying violent hands upon the spoil. They maintained that they had a hereditary right to it, as the descendants of those who had buried it, and were about to make a raid upon the workmen, when their attention was diverted by the attack of a body of Mussulmans, who, arriving from a neighbouring village, claimed their part of the spoil.

"'Against these marauders the argument of the natives was obvious, and ought to have been convincing. The ornaments were Coptic, and it was evident that the Copts alone could have any heredi-

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tary right to it. Nevertheless, the dispute lasted long enough to save the treasure from either party. It had just been compromised, and the two local factions were about to renew the assault in company, when the soldiers arrived with fixed bayonets, and seized the expected booty, which was soon safely lodged in the museum.' "—*Globe.*

Archæology is quite of modern origin, and, until within the last few years, excavations were conducted on no definite principles. Now, however, archæology takes rank as an acknowledged branch of science, and its votaries are learning so rapidly to decipher the smallest indications of valuable relics, that an excavation is seldom made without results, and, in many cases, the searchers find the very objects for which they are looking.

As yet, we have barely begun our systematic quest after the treasures which our predecessors have left beneath the surface of the earth, but the value of the discoveries which have already been made is so great that we have reason to hope for tenfold results in the future.

CHAPTER V.

THE CLUB.

Arrangement and development of weapons—Weapons and tools—The Club in its simplest form—The Waddy, or Australian club—Its use as a missile—A point of honour among savages—Preliminaries of their duel—Native courtesy—The Australian skull—Honour satisfied—The Marpangye club and its uses—The clubs of New Zealand—The Merai—Its material, form, and weight—Mode of using the merai—Merais of jade, stone, bone, and wood—Shark-tooth merais—Artistic carving—The E'hani, or Chief's club or sceptre—Its use as a banner—The Patu, or battle-axe—Mode of using it—The feather-tuft and its object—Feathers of the Moa.

AT first sight, nothing seems easier than the division of such a work as this into its several portions. Clubs, hammers, axes, and paddles, for example, seem to be perfectly distinct, and yet the three last implements are but modifications of the first, so as to perform the varying tasks which have to be fulfilled.

Thus, the dagger is nothing but the pointed stick, which is also used as a digging implement and a climbing spear. Let the stick be lengthened, and there is the spear. Modification does not stop here. We have the lance as a hand weapon, and also as a javelin or missile.

Carib and Club.

In civilised armies it has been long disused as an infantry weapon, having been superseded by the bayonet. But it is still invaluable as a cavalry weapon, and, in the hands of brave semi-savages, can do terrible execution even against civilised troops, as was only too well demonstrated in the late Soudanese war.

A smaller and lighter spear can be thrown by hand with great effect, sometimes being flung by the unaided hand, as with the Kafir tribes, or it may be hurled by the assistance of a throwing-stick, as is done by the Australians and Eskimos ; or by a thong, as was done by the ancient Romans, and at present by the New Caledonian savages.

Diminish the size and weight of the spear still more, substitute a bow for the throwing-stick, or the thong, and we have the "cloth-yard" arrow which did such service in the history of our country. Then, the thong by which the spear is thrown is nothing but a modification of the sling, while the "bolas" of South America are simply elongated slings with the stones permanently attached to the thongs.

Again, beginning with the dagger, we find it gradually lengthened until it becomes a sword. Notch the edge of the sword, and there is the saw. The military reader will here note that, in many military swords, the back is notched, so as to convert the weapon into a tool, when it is wanted for cutting down wood instead of cutting down human beings.

Similar modifications are to be found in nearly all, if not all, tools and weapons, and the reader will, therefore, see that it is impossible either, on the one

hand, to treat each kind of weapon or implement separately, or, on the other hand, to describe them in any continuous sequence.

THE very earliest and simplest of weapons is evidently the CLUB. The material of which a club is made is of very little consequence, as long as it be sufficiently strong to endure a blow without breaking, and sufficiently heavy to make the blow effectual.

Wood is, of course, the most usual material for the club, but it may be of stone, metal, or even bone. The leg-bone of an ox, or a moose, or a large ante-

Australian Clubs, or "Waddies."

lope, would make a very effective club, while the human thigh-bone has often been used for the same purpose. The reader will call to mind the grisly tale of Sindbad in the burial-cavern, where he is represented as using a human thigh-bone as a club wherewith to knock out the brains of those unfortunates who were lowered alive into the pit.

The metal club, or "mace," is familiar to all students of history, and examples of clubs made of stone and bone will presently be given.

As might be expected, we find some of the simplest forms of the club in Australia, two of them being shown in the accompanying illustration. They are made of the hard and heavy gum-tree, and at close quarters can be used with great effect. The Australian native can also throw them with great force and precision, just as the Knight of the Leopard is represented as hurling his short iron mace at Saladin.

As he generally carries several waddies, and hurls them one after the other with lightning-like rapidity, leaping to a different spot as he flings each weapon, the effect of this storm of missiles can well be imagined.

One extraordinary use of the "waddy," as this club is called, is its employment as a duelling weapon. Savages though the Australian blacks may be, they have their own code of honour, and an infringement of a point of etiquette is sure to result in a duel. These passages of arms do not consist, as might be imagined, in savage and furious combats, but are conducted through third persons, and managed with a deliberate courtesy which could not have been exceeded by our most practised duellists of seventy or eighty years ago.

Should a native warrior feel himself aggrieved by another gentleman of the same tribe, he proceeds to heal his wounded honour in a very ceremonious fashion.

Should the offender belong to another tribe, the insult can only be wiped out by killing him, eating part of the body, and using the fat of the slain

enemy as grease for the skin. But, when both belong to the same tribe, a challenge is sent, appointing time and place, and politely recommending the antagonist to bring his heaviest waddy with him. Perhaps the reader may remember that, in a similar spirit of courtesy, Ivanhoe recommends the Templar to procure a fresh horse and a new lance.

When the combatants arrive on the ground, the challenger lays down his waddy, stoops forwards, and rests his hands on his knees, so as to present the crown of his head to the foe, who raises his waddy with both hands, and brings it down with all his force on the unprotected head. The blow would crush the skull and scatter the brains of any European. But the skull of the Australian black man is made of sterner stuff, and is so portentously thick that the blow scarcely stirs him from his position. Then, the two change places, and so the queer battle goes on until one of the combatants does at last succeed in laying his antagonist prostrate, or, what is still more honourable, has the opponent's waddy break upon his skull. In either case, the seconds pronounce honour to be satisfied, and both parties become the best of friends.

Of this club there are three modifications. One, called the "marpangye," has already been described and figured on page 26. Another form retains the straightness of the ordinary waddy, but is so flattened, and so sharp at the edges, that it answers the purpose of a sword. The third variation combines the curve of the one weapon with the flatness of the other, so as to form the celebrated boomerang. This

remarkable instrument will be described and figured on a following page.

NOW we will turn to the NEW ZEALAND clubs. There are very few of them, for, as is the case with many warrior-races, the Maoris preferred simplicity in their weapons, and, like the ancient Romans, restricted them to those which would be most effective in a hand-to-hand combat.

The characteristic weapon of the Maori is the Merai, which scarcely ever exceeds eighteen inches in length, and, as a rule, falls five inches short of that measure. The largest that I have ever handled was not quite eighteen inches in length, and only four inches wide at its broadest part. These weapons are made either of wood, stone, or bone, and examples of each kind are here figured and described.

Stone Merai.

The typical merai is that which is made of stone, and which is always formed on the same model, its dimensions depending on the size of the material. Usually it is made of the hard green-stone, which is so largely used in axe-heads and other native implements. A specimen in my possession measured fourteen inches in length, and nearly four inches in width. This specimen is here figured. It was given to me by the late T. W. Wood, of Chatham, who contributed many illustrations to my works on Natural History.

A few of these merais are made of green jade, and are extremely valuable. Even the "tikis," ear-drops, and other ornaments made of jade by the Maoris are exceedingly costly, but the jade merais are so priceless that none but very great chiefs can possess them.

They are handed down as heirlooms, and a chief who possesses one of these precious insignia of rank would be scarcely more likely to sell it than would the Queen to sell the Koh-i-noor. Those specimens which adorn collections in Europe have almost always been taken in war. One of these weapons is given in the accompanying figure.


Jade Merai.

The merai is used in rather a strange fashion. It is generally thrust at the neck or chin, and as the antagonist staggers back from the blow he is cut down with the edge. Weight, therefore, is a necessary element in the merai, and so the stone or jade weapons are doubly valuable.

Two varieties of the wooden merai are given on pages 66, 67. That on the left is the usual form, but the innate artistic spirit of the Maori is seldom satisfied with a perfectly plain wooden merai, and most of these weapons are adorned with more or less elaborate carving.

Sometimes, as in the two last specimens, the native artist carves his merai into patterns as elaborate as

those of the tattooing which adorn his face, and adds to its efficiency by arming the blade with a row of shark's teeth, the serrated edges of which are of almost lancet-like sharpness.

Next comes the merai which is made of bone.

Wooden Merais.

As the largest indigenous mammal of New Zealand is the rat, the Maori is obliged to go to the sea for a bone merai, and, accordingly, sets exceeding value on the body of a spermaceti whale, as its bones will furnish quite a number of weapons. The shoulder-blade is mostly used for this purpose, but the lower

jaw will supply material which is, perhaps, better than that of the shoulder-blade.

The right-hand figure of the illustration on page 68 was drawn from a specimen belonging to myself, and next to it is shown a section of the jaw-bone. This bone is quite spongy in the centre, for the sake of lightness, but, towards the surface, it becomes quite dense, hard, and heavy.

This is the portion which is used in making merais, and, as the dense layer is thin, the merai must also be thin. The reader will notice that in the section are two oval holes. These show the channels through which pass the blood-vessels which nourish the bone. The track of one of these vessels is shown on the right-hand figure, while on the outer edge of the left-hand figure may be seen the remains of a similar aperture.

Merai, Wood, edged with Shark-teeth.

The native carver, not being able to evade the

hole, has modified it so as to make it look as if it were an ornament, while he has modelled some similar apertures and grooves on the opposite side by carving them into the characteristic scrolls in which the Maori artist revels.

In length, my specimen was seventeen inches, its

Bone Merai.

Section.
Bone of Spermaceti Whale.

Bone Merai.

extreme width three and a half inches, and its weight one pound nine ounces.

A very remarkable modification of the merai is the E'hani, which is often designated as a spear. One of these objects is shown in the accompanying illustration, and, as the reader will at once perceive, although

at first sight it resembles a spear, in reality it is a greatly elongated merai.

But it is not a club any more than it is a spear. It is simply a staff of office, or sceptre, and may be carried only by a chief as a mark of rank. In battle, it answers the purpose of a banner. The size of the E'hani varies exceedingly. In general, it is about five feet in length, but sometimes, for the sake of convenience, is only two feet long.

E'hani.

The upper portion, which looks very much like the head of a spear, is, in reality, a conventional representation of a tongue thrust forwards to its fullest extent, and just behind the base of the tongue are two mother-of-pearl disks, which are conventional representations of eyes.

With the Maoris, the act of thrusting out the tongue is a gesture expressive of contempt and derision, and, when two hostile forces meet, the chiefs of either side yell their fiercest threats with voices that Stentor himself might have envied, while they incessantly thrust their E'hanis towards the enemy as indicating that they are putting out their tongues at the opposite leader.

In their terrific war-dances, the Maoris put out their tongues to a wonderful extent, the act being equivalent

to a challenge of the enemy. If "Romeo and Juliet" were to be translated into the Maori language, the famous "Do you bite your thumb at me, sir?" would have to be exchanged for "Do you put out your tongue at me?"

Patu.

The second weapon of the Maori, namely, the "Patu," is here represented, and is used in rather a curious fashion, the point being employed quite as much as the head. It is sometimes, but wrongly, called a battle-axe, but is really a club, the blow being struck, not with the edge of the head, but with the back.

The reader will notice that in these weapons a bunch of feathers and hair is sometimes affixed to them. In the case of the E'hani the feather-bunch is purely ornamental, but when it accompanies the patu it is an essential portion of the weapon.

The Maoris are skilful of fence, and, when two champions engage each other, they whirl the feather-bunches round and round, flourishing them in the face of the antagonist so as to distract his attention, and leaping from side to side with terrific yells. When an opening is seen the sharp point is darted at the body, and, if the thrust should take effect, it is followed up by a blow on the skull or neck with the head of the weapon. The Patu is about four feet in length.

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Usually, the feathers are those of the apteryx, the skins of which birds are sometimes employed in making feather mantles for the chiefs. But in the British Museum are some patus brought from New Zealand by Captain Cook, and in them the feathers are those of the now extinct Moa, showing that this gigantic bird existed up to a comparatively late period.

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CHAPTER VI.

THE CLUB (*continued*).

Fijian clubs—Their variety of form and size—The Pine-apple club and mode of making it—The tap-root and aërial roots—The wooden gauntlet used in the game of "pallone"—The Paddle-club—Skill of the maker—The Marquesan club—Its great size and weight—Ornamental carving.

JUST as the merai is characteristic of the New Zealander, so are these forms of club characteristic of the Fijian.

There is an infinite variety of club in the Fiji Islands, and nearly all of them are heavy two-handed weapons. Different as they may appear, both of the clubs figured on page 74 are formed on the principle of the Australian pick-club, or "marpangye," figured on page 26.

The first of these weapons is painfully cut out of solid wood, and is covered with patterns which vie in elaboration with those of the New Zealander, but lack their artistic power. The holes which are bored along the edge are probably for the attachment of feather-bunches and similar ornaments.

It is exceedingly heavy, and, although a successful blow from it would be fatal, its very weight would leave the whole body exposed in case the stroke failed. The Fijian is perfectly aware of this fact,

[redacted]

and, therefore, prefers to steal on his enemy while sleeping, and knock out his brains without danger of retaliation.

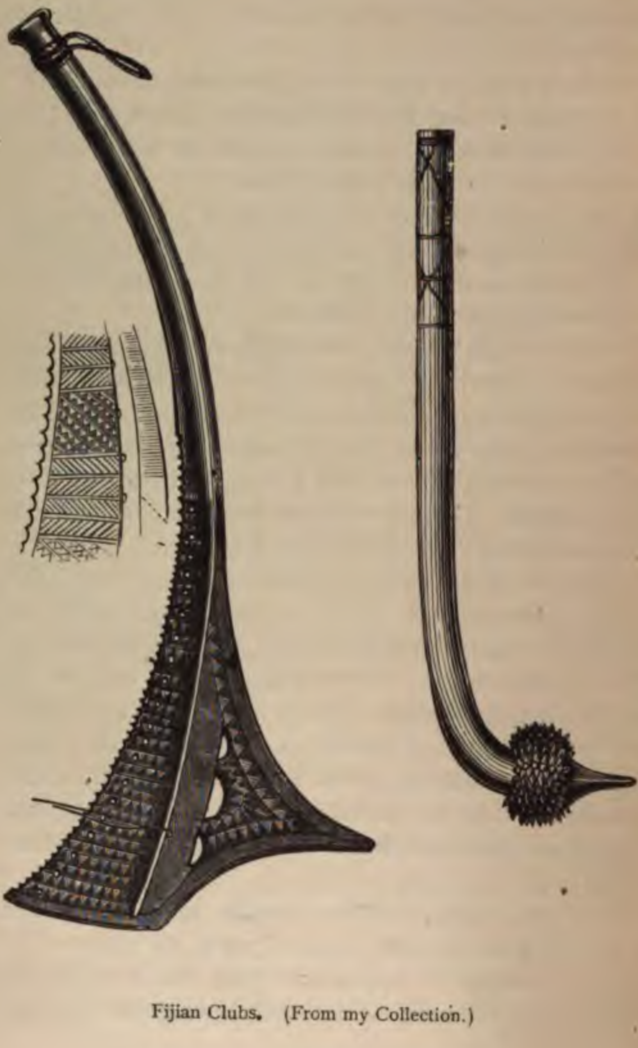
Skill of fence is quite impossible with so unwieldy an instrument, and a Fijian warrior armed with this club would have no chance against the agile Maori armed with either the patu or merai.

The second form of club seems to be peculiar to Fiji. It is made from one of the tropical indigenous trees which have a single central, or tap-root, and a number of aërial roots above it.

When a Fijian wishes to make one of these clubs, he has to exercise a good deal of forethought, and prepare his tree several years before he can use it. Finding a very young tree, he bends the stem downwards, and fastens it so that it is almost parallel with the ground. There he allows it to remain until it has grown thick enough for the purpose.

After severing the aërial roots, he digs round the tap-root and cuts it off of a convenient length for the point of his intended weapon. The aërial roots are then trimmed to a uniform length of an inch or so, and are nicely pointed. So, if in a downward stroke the pointed tap-root should miss the head, the sharp ends of the radiating aërial roots would produce unpleasant results to the bare shoulders. On account of this peculiar form, it is sometimes called the "pineapple club."

It is remarkable that the peculiar wooden gauntlet which is used in the Italian game of "pallone" is almost identical in appearance with the head of the Fijian club. In the oldest of these gauntlets, the



Fijian Clubs. (From my Collection.)

[redacted]

points were cut upon the surface of a thick wooden cylinder, which was then hollowed for the reception of the hand and wrist. But, as these points were necessarily cut against the grain of the wood, those of more modern date are made separately out of hard wood, and are set in holes bored in the gauntlet.

I have selected the next two forms of Fijian club because they illustrate the transition from the club to the paddle.

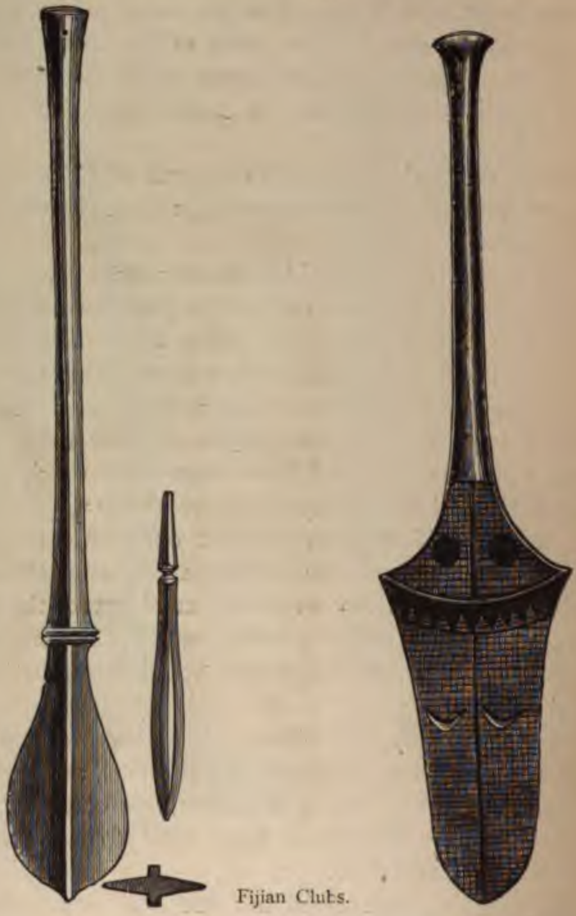
The regularity with which these people shape the outlines and carve the decorative patterns of their weapons is really wonderful. Any of us who have tried our hands at working in wood are aware by experience of the difficulty of making both sides alike.

Most boys have, at some time of their lives, cut boats out of wood, and have been very much disgusted to find that they were invariably lop-sided. Yet, these semi-savages, without our saws, planes, chisels, gouges, centre-bits, compasses, and similar appliances, and having no better cutting tool than a sharp stone stuck into a wooden handle, can turn out specimens of workmanship which no European artisan could surpass.

They seem to feel no dismay at the insufficiency of their tools and the hardness of the wood, and strike the boldest curves with a precision that can only be appreciated by those who have tried to achieve a similar task themselves.

The first of these clubs has the head much flattened, as may be seen by the side view and section. But the second club is so wide and so flat that it

looks much more like a paddle than a club, and, indeed, is used for either purpose. The specimen



Fijian Clubs.

from which the drawing was taken is not quite an inch thick in the centre.

The last characteristic club for which space can be given is the really beautiful weapon which is made by the Marquesans.

So variable in point of detail that no two clubs are alike, it is always made on the same model. The length is, on the average, five feet, and the weight, therefore, is very considerable.

The handle is quite smooth, passing by a bold and graceful curve into the head. It is shaped very much like a shallow mitre, as may be seen by the side view on the right hand of the illustration. On each of the sides is an ornamentation which is evidently a conventional representation of the human face, like the Maori E'hani, which has just been described. In this specimen the two eyes are represented by radiated

Marquesan Club.

circles, each bearing a human head in the centre. The arched brows overhang the eyes, and unite in a ridge which represents the nose, and ends in another human head which takes the place of the mouth.

All these figures of clubs were drawn from specimens which belonged to my own collection.

[redacted]

CHAPTER VII.

MISSILE CLUBS.

The "Knob-kerri" of Southern Africa—Its form, size, and material—The rhinoceros-horn kerri—Mode of throwing the kerri—Its use in hunting—Bird-killing—A snipe killed with the kerri in the New Forest—Effect on the bird—The Ula club of Fiji—A practical joke—The Macana club of South America—Club-throwing matches—The Boomerang of Australia and its development from the club—Structure of the boomerang—Modes of throwing it—A wonderful feat—Hunting and war boomerangs—The ordeal of the boomerang—Effect of its sharp edge.

ALTHOUGH so small in size and heavy in weight, the New Zealand merai is never used as a missile, being prized too highly for such a purpose. The Maori warrior would no more fling his merai at an opponent than King Arthur would have flung his sword Excalibur. He never allows his almost sacred weapon to pass out of his hands, and when going to battle he secures it to his wrist by a stout thong.

There are, however, many hand-clubs, which can either be used as weapons in single combat or for missile purposes.

The typical missile club is the "Knob-kerri" of the South African Kafir. It is one of the most variable of weapons, both in length, thickness, and

material, but always consists of a straight handle, terminated by a knob.

In his own country, a Kafir is never happy unless he carries a weapon of some sort in his hand, even though it be but a stick, and, even if he be otherwise armed, he is tolerably certain to have two or three knob-kerries with him.

The usual form is that which is seen in the illustration, the length of the weapon being, on an average, about eighteen inches. Generally, it is made of some heavy wood, such as the acacia; but, if a Kafir hunter be fortunate enough to kill a rhinoceros, he will with infinite labour carve the larger horn into a knob-kerri, and be envied by all his compeers.

Knob-kerri.

Before the use of fire-arms became general among these warlike tribes, every able-bodied man was obliged to furnish himself with a shield, a bundle of five javelins, or assagais, and several short knob-kerries. When the warrior went into action, the kerries were stuck into his belt, and reserved for hand-to-hand fight when the assagais had been expended.

The knob-kerri is also used for hunting purposes, and is hurled with tremendous force and great precision. In the accompanying illustration a young Kafir is represented as killing the hyrax, or "rock-rabbit," as it is popularly called. It is almost identical with the hyrax of Syria, which is the animal called "coney" in the authorised version of the Old Testament.

As may be seen, the young hunter, taking with him a supply of knob-kerries, has silently stolen upon some rock-rabbits under cover of the ground, has succeeded in knocking down one of the animals, and is aiming his second kerri at its companion. Should the second missile fail, a third and a fourth will be hurled at the animal; and so rapidly is this done, that

Throwing the Kerri.

the hyrax, which can dart about with lightning speed, has but little hope of escape.

The Kafir will even chase birds with the knob-kerri, his principal quarry being the "pauw," a sort of bustard, and the quail. Neither of these birds flies to any great distance, so that, when they are startled, they are sure to settle within sight. Two hunters generally unite in this chase, walking about fifty yards

apart, and each carrying a good supply of knob-kerries. They previously arrange the mode of throwing, and then start towards the birds.

When they have come within range, they startle the bird, and, as it rises, one of them, usually the one on the right, flings his kerri about a couple of yards above it, while the other aims as much below it, and a second or so later. The result is that the bird, alarmed at the weapon above it, dives down, and so is arrested by the second missile.

Should the birds be wild, one hunter lies down, while the other makes a large circuit so as to get the birds between himself and his comrade. He then gives a shout, startles the birds, and drives them towards his friend. As soon as they settle, the second hunter jumps up, and drives them back again. So they go on until the birds are so tired that they allow the hunters to come within range.

In the summer of 1861, a friend of mine accompanied me on a visit to the New Forest, where we lived in a very rough-and-ready style, occupying one of the keeper's "lodges." My companion, a captain in the Royal Artillery, had been stationed for a considerable time in South Africa during the war, and also after its termination until the withdrawal of the troops. Having much leisure on his hands, he employed it like a wise man in acquiring the Zulu language, and learning to hunt in Kafir fashion.

After we had been in the Forest for a few days, he suggested that we should try this mode of procuring game. There were plenty of snipe in the marshy ground, and so, on July 1, we started off, each

[redacted]

carrying three or four knob-kerries. We followed the second plan, and in the course of the morning did succeed in killing one snipe. The bird fell to my friend's knob-kerri, which cut off the right wing, and smashed the right side of the head.

I wrote an account of our adventure, and was denounced by several of the sporting papers as outdoing Baron Münchausen in power of invention, and having destroyed for ever my character for credibility. My friend wrote to the journals in question, but without the least effect. Yet the account was perfectly true, and my friend, now a major-general, is still alive to corroborate it.

In the course of the same morning, I missed a snipe by barely an inch, and was greatly disappointed at my ill-luck. Yet, on the whole, I could not but be glad that I narrated my friend's prowess, and not my own. My diary (accompanied with many sketches) is now before me, and contains the following entry :—"July 1. Peewits—could not find nest. Snipe-hunting, one killed by A——, and one nearly by me."

A weapon almost identical with the kerri is used by the Fijians, and is called the "Ula." The act of throwing it is called "ula-ula." It so happens that in the Fijian, as in other languages, one word may bear several meanings, and in this case, the compound word ula-ula signifies both club-throwing and house-thatching, giving rise to an amusing practical joke.

Now, the first thatching of a new house is always held to be a high festival, and it is the kindly custom

among the Fijians to volunteer help for those who are engaged in house-building. They work as long as it is light, and the evening is given to festivity. In fact, the ula-ula might be translated as "thatching-bee."

On one occasion, the people of M'bau sent a message to those of Tai-levu, inviting them to ula-ula. Expecting the usual scene of merriment and good cheer, the Tai-levu people repaired to the designated spot, and found themselves received with volleys of ulas.


The Macana Club.

A RATHER remarkable example of a missile club is here given. It is called by the name of Macana, and is in use, with some variations, through a very large portion of South America, especially among the tribes of Guiana. It is about fourteen or eighteen inches in length, and when used in hand-to-hand fighting is held by the middle.

As it is made of some species of iron-wood (one of the guiacums), it is very heavy, and some specimens are made more formidable by the insertion of a stone cylinder near one end. Much ingenuity is displayed in fastening the stone in its place. Having fixed upon a branch which will furnish a good club, the maker, who has already prepared the stone, bores a hole into the living branch, and drives the cylinder into it. There he leaves it, and in course of time the

wood grows so firmly around it, that no amount of force will remove it. The branch is then cut down, and the club carved into proper shape. The young men are great experts at flinging the macana, and often hold throwing matches with the macanas just as we hold rifle or archery matches.

THE following illustrations represent the most extraordinary weapon which the mind of a savage ever conceived or his hand directed. This is the celebrated Boomerang of Australia, which, as will be seen, is a gradual development of the missile club, the specimens having been selected in order to show the manner in which the transition is accomplished.

In the accompanying illustration, No. 5 represents the small hand-waddy or "wadna" of the Australian native. In appearance it exactly resembles the kerri of South Africa and the ula of Fiji, the knob being formed from the enlarged portion of a branch whence smaller branches proceed.

If the angle of a bent branch be chosen, the result is the "marpangye," which has already been described. Two varieties of it are shown at Figs. 6 and 7 of the illustration on page 26.

Now, turning to the second illustration, it is easy to see that the weapon shown at Fig. 2 is simply a flattened marpangye, while Fig. 1 shows a similar form, only still more flattened. Yet both these weapons are boomerangs, and not clubs.

There can be but very little difficulty in tracing

the evolution of the boomerang from the simple club. The superior powers of the flattened marpangye as a

Australian Boomerangs and Clubs.

missile must have impressed the mind of the native, who accordingly made the missiles flatter and flatter

until they assumed the form shown in Figs. 1 and 2 in illustration B.

Then it would be found that, when a whirling movement was given to the weapon, its course would become erratic, and so the native devised means for controlling and utilising the track of the instrument until he produced the perfected boomerang, and learned how to use it.

B

Australian Boomerangs.

In form and size, there is a wonderful variety in boomerangs, no two being alike. It is essential that the lower surface should be nearly flat, and the upper surface slightly rounded. It is also essential that it should be more or less curved, but details of length, width, and character of curve are left to the maker.

Mostly the curve is nearly uniform, as in Figs. 1 and 3 of illustration A; but in the whole of the

boomerangs on illustration B, the curve is exceedingly irregular, while at Fig. 2 of illustration A a double curve is indicated. There are some specimens where the double curve is carried out still farther, so that the instrument assumes a sort of S shape.

Simple as the boomerang appears to be, no one but an Australian black man can make or throw it properly. If we were to see a native black man throw a boomerang successfully, purchase the weapon on the spot, furnish the best European cabinet-maker with the specimen and a piece of gum-tree wood, and tell him to make an exact copy of the boomerang, the result would be an instrument that not even the same Australian could wield.

Not every native can make a good boomerang. He may be able to throw it, but must be a skilled workman to make it. The process is a long and tedious one, the maker incessantly balancing the weapon in his hand, and chipping here and there as needed. It is as impossible for a beginner to make a good boomerang as for a novice to play one of Liszt's most elaborate compositions for the piano.

Many natives are widely known for their skill in boomerang-manufacture, and can command high prices for their weapons. One man, indeed, had attained such a name and became so rich, that he attained the rank of head chief of a district, or, as the office is sometimes called, a local king.

As to throwing it, I do not think that any but a native Australian can attain the art. Many Europeans, myself included, can throw the boomerang sufficiently well to make it describe a great circle in the

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air and return to the thrower, but an Australian can do much more than that.

I have seen a black, whose portrait is now before me, perform a most astonishing feat with the boomerang. He was very short in stature, very slight and wiry in figure, and had an enormous head of hair looking like a huge black mop, so that at a distance he looked like a black nail with a very large head.

When he threw the weapon, he ran a few paces, and then leaped forward. As he sprang from the ground, he swung his right hand behind him, so that the boomerang touched his left side. As he reached the earth after the leap, he whirled his right hand above his head, and, with a loud yell, launched the missile into the air.

Its flight was something wonderful. I have seen many natives throw the boomerang, but never saw one of them who could approach the skill of this little man. As it flew through the air, the instrument looked alive, and it was scarcely possible for the spectator to divest himself of the idea that it was a winged creature choosing its own course, like a pigeon let loose from the loft.

When the boomerang had completed its circle and returned to the thrower, I expected it to fall to the ground as usual; but, to my astonishment, the weapon proceeded to traverse another circle, and finally dropped into the hands of the thrower just as if it were a falcon returning to its master's wrist. Over and over again did he throw the boomerang, and scarcely ever failed to make it complete two circles. During its flight, the weapon rose high from the

ground, and as it whirled through the air, spinning round and round like a Catherine-wheel firework, it produced a loud rushing sound not unlike that of the firework in question.

This mode of throwing the boomerang is, however, merely the ornamental phase of the weapon, denoting the skill of the thrower; but the native wants the boomerang chiefly for use, either in killing animals for food, or as a weapon of war.

Sometimes it is thrown directly at the object of attack, and sometimes the circling power of the weapon is brought into use. Sometimes, if an animal—say, a kangaroo—be on the opposite side of a low tree or a rock, the hunter has a way of throwing the boomerang against the ground, so that, in rebounding from the earth, it leaps over the obstacle and descends upon its object.

The Kafir, by the way, can use his knob-kerri in a similar manner, flinging it on the earth in such a manner that it rebounds, and strikes the adversary from below in a fashion very bewildering to an enemy who does not know the peculiar powers of the simple weapon.

The three boomerangs on illustration A are intended chiefly for war purposes, the others being used for hunting. The reader might fancy that their objects were exactly reversed, the latter being much harder and stronger than the former.

But, the native knows what he is about. The flight of the weapon is so erratic, that even the quick-eyed and active Australian cannot be sure of evading it; so he has a shield, which is intended to receive

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the shock of the weapon, and if possible to deflect it. But, the boomerang-maker provides against the shield by making the weapon comparatively fragile. When it meets the shield, it breaks, and the broken pieces fly inwards, so that their edges take effect upon the adversary.

This shield will be figured, and its mode of use described in a future page, when we come to defensive weapons.

The reader may remember that, in the course of describing the duel with the waddy, I mentioned that the proceedings were conducted with just such grave formalities as might have been expected from the Courts of Honour of the Middle Ages. All three weapons, namely, the waddy, the boomerang, and the spear, are employed in these remarkable ordeals.

That which has already been described is a trial of strength on the one side, and endurance on the other, skill having no part in it. In the following ordeal, however, skill in the use of the weapons on one side, and quickness of eye and limb in avoiding them on the other side, were put to the test.

The scene was witnessed and described by Mr. Lloyd. A young man, who had infringed some article of the native code of honour, was divested of his clothing and weapons, and in that defenceless condition had to withstand the attacks of two warriors, each armed with two spears and a boomerang.

They took up their position at a spot about sixty yards from the culprit, and then showered their weapons upon him with the wonderful rapidity which

is characteristic of the native warrior. In spite his defenceless condition, the young man contriv to evade all the weapons except one boomerang. T missile caught him on one shoulder, and struck a piece of flesh as large as a crown piece. Tl wound terminated the ordeal.

Mr. Lloyd states that the cut of the boomerang w as clean as if it had been made with a razor.

CHAPTER VIII.

EDGED MISSILES.

Rotary-edged missiles—Throwing-knives of the Neam Nam tribe—Character of the natives—Their ignorance of white men and fire-arms—Mr. Petherick's adventures among them—Dimoo, the incredulous chief—White man's tobacco and its effects—Mode of using the missile-knife—The Chakra, a war-quoit of India—How it is carried and used in battle—Bracelet-weapons of the Djibbas—How bracelets are converted into weapons.

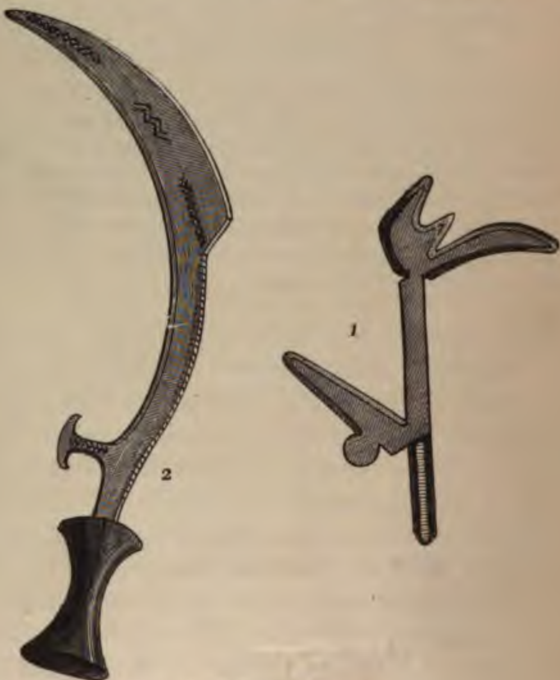
FOR some time I could not decide upon the relative position of the two remarkable weapons which come next in order; but, as they are cutting weapons, and have a rotating movement when flung, I have considered them as allied to the boomerang.

Just as the boomerang is a missile club, so these weapons are missile swords—the sword, indeed, being originally a flattened club with sharp edges.

The formidable instruments which are shown in the accompanying illustration are used by the Neam Nam, a fierce and warlike tribe of the tropical Nile district. For our knowledge of these we are indebted to Mr. Petherick, who remained among them for some time, and who gives a most interesting and amusing account of them.

When his party first entered the Neam Nam district, he could hardly induce his porters to remain

with him, so great was their terror of these ferocious cannibals. They had never even heard of white men, or even of fire-arms, and their terror at the shooting of a flying vulture is most amusingly described. Their head chief, or "king," however, a man named



Neam Nam weapons.

Dimoo, was more proof than any of his subjects against the supernatural power of his guests, he not having witnessed the successful shot.

Even he, however, succumbed at last, after Mr.

[redacted]

Petherick's men had killed an elephant with a single volley, and, instead of eating his guests, he looked upon them as demi-gods, and treated them with becoming deference.

Like all native Africans, Dimoo was inordinately fond of tobacco, and became rather importunate in begging for it. Mr. Petherick at once saw his opportunity, and for some time refused the request, saying that white man's tobacco was dangerous for black men to smoke because it always broke the pipes of those who meant to be treacherous.

Dimoo, however, suspected (which was a fact) that the visitors did not want to part with their tobacco, and so continued his demands. The native pipe holds about a quarter of a pound of tobacco, and so Mr. Petherick had no difficulty in placing a small charge of gunpowder in it. Dimoo began to smoke in the usual violent manner of the savage, when suddenly the gunpowder exploded, and the pipe was blown to pieces. Down went Dimoo and his councillors, tumbling over each other on the ground; the power of the white man was never again questioned, and he was allowed to smoke his own tobacco in peace and quiet.

Savages and cannibals though they may be, they are wonderfully good workers in iron, and with their imperfect tools contrive to forge not only weapons, but ornaments, some of which will be shown in a future page.

These curious instruments, which are here depicted, are quite flat, and are used for two different purposes. Fig. 2 is used after the fashion of the Roman

sword, and is reserved for close quarters. Fig. 1 represents the missile sword, the forms of which are quite as varied as those of the boomerang. When the warrior goes to battle, he carries four or five of these weapons inside his shield, and hurls them in rapid succession against the enemy, just as the Kafir hurls his kerries.

THERE are many more missile cutting-weapons which are worthy of notice, but there is only one for which space can be found. This is the celebrated Chakra of India, which is carried and used after a very remarkable fashion.

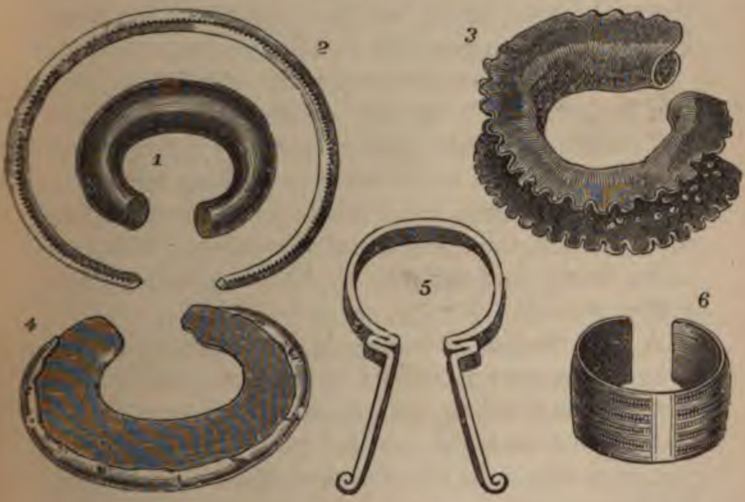
The Chakra, or Quoit weapon.

It is a veritable quoit, but one which cannot be handled like the quoit which is used in games, the edge being kept as sharp as a razor. It is very thin, so that, although it is between seven and eight inches in diameter, it is comparatively light. Several of these weapons are carried upon the tall conical hat or turban. When used, the warrior snatches it off the turban, hangs it on his forefinger, spins it rapidly, and then hurls it circling through the air at his opponent. Like other similar missiles, several chakras are

flung in rapid succession, and are mostly aimed at the neck and head.

The reader may remember that in the many-armed idols of India several hands are represented as holding a sort of hoop. This hoop is the chakra, and is given to the idol as denoting the destructive power of the god whom it represents.

IN the accompanying illustration are represented



Djibba Bracelets.

some very remarkable objects. They are bracelets worn by the Djibba tribe of Africa, inhabiting a large district near the great Nyanza lakes. They are especially valuable as showing the transitional states of a weapon developed out of an ornament.

Figs. 1 and 2 exhibit the simplest form of the Djibba bracelet, which is little more than a bar of iron bent round the wrist. The first of these ornaments belonged to a man, and weighs about a quarter of a pound, while the second is intended for female wear, and is comparatively light.

At Figs. 5 and 6 are two other forms of the woman's bracelet and anklet, but we have to deal chiefly with the weapon bracelet of the man. It seems to have occurred to some ingenious Djibba smith that a bracelet which weighs a quarter of a pound or more ought to be useful as well as ornamental.

So, instead of merely forging the iron into a solid bar, he first beat it out into a flat and broad ribbon, and cut the edges into regular notches. He then rolled the edges inwards, and finished by carving it into the form which is shown at Fig. 3. The ornament thus takes to itself the character of a weapon, which can inflict many and painful if not immediately dangerous wounds.

A still farther advance in the efficacy of the bracelet weapon is shown at Fig. 4. Instead of notching and rolling the edges, the native smith has simply thickened and rounded the inner edge, while the outer edge is as sharp as that of a knife. Indeed, the weapon looks very much like an imperfect chakra worn on the wrist and not intended to be thrown. As the edge would be dangerous if left unprotected, it is always covered by a leathern sheath, which can be snatched off in a moment when the ornament is to be used as a weapon. If it were flung like the chakra, it would be nearly as formidable a weapon.

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CHAPTER IX.

THE KNIFE AND CHISEL.

The hunter's need of a knife—The Flint-flake—Its fragility—Making the flakes—The Nucleus, or Core—The Eskimo flint-chippers—"Flint-jack" and his work—Gun-flint manufactory—Ingenuity of the Maoris—Metal knives—The Bronze knife—Egyptian and Assyrian knives—Invention of the handle—Primitive knives—Axe-knife—The Chisel—Remarkable engravings on ivory, bone and deer's-horn—Bornean and Bechuanan knives—The Gouge—A Tahitan gouge—Women's knives.

WE will now revert to the primary needs of a hunter, and suppose that he has knocked down a deer with his club, or taken it in a pitfall. Other wants immediately beset him. He cannot tear the animal to pieces with his hands and teeth as if he were a beast of prey, nor will he eat the flesh raw except when driven by necessity. So, having used his club wherewith to strike his prey down, he wants a knife wherewith to cut it up, especially as he will need the skin for clothing and various domestic purposes, and must not tear it away piecemeal.

The simplest form of knife would necessarily be a sharp-edged stone, and a little experience tells him that the flints will furnish him with an unfailing supply of knives.

It is true that their edges, however sharp they may

be, are extremely brittle, and will soon become blunted and useless. Its fragility is, however, of little consequence, and, as soon as the man spoils one knife, he throws it away and takes up another.

So, when a number of human beings inhabit one spot for a length of time, it is evident that great quantities of these primitive knives will be found. Such, indeed, is the case. A single flint-flake is not often found, unless in soil that has been transported from its original locality, the rule being that, wherever ancient man has dwelt for any time, there will be found plenty of flakes.


Flint-flake, or Knife.

Not many years ago, when palæology was a new science, the discoveries of relics of ancient man were not only discredited, but ridiculed, and the flint flakes were pronounced to be purely accidental fragments, and such as could be produced by two flints struck casually against each other, or by the blows of the workman's pickaxe.

Yet a flake of flint is as much the work of human art as is the boomerang, and equally needs skilled labour.

It is not every flint that will produce flakes, nor, even if the right sort of flint be produced, is it every one who can strike the flake from the flint. No amount of banging flints together at random, or of striking with a labourer's pickaxe, will separate a flake.

No violent blow is needed, nor is any sharp and

hard instrument required. The flint must be of the right sort, and must be fresh from its bed. The operator must know the lines of cleavage, and with the simplest of instruments can remove flake after flake, until nothing is left except the "nucleus" or "core," such as is shown in the accompanying illustration.

These cores are often found in company with the flakes that were removed from them, and both are examples of handiwork produced by skilled human labour. As to the instruments which are used in separating the flakes, almost anything will answer the purpose in skilful hands. Another flint, a fragment of bone, a broken stag's antler, or even a piece of hard wood, will answer the purpose.

Flint Nucleus, or Core.

The accompanying illustration represents the flint-chipping instrument which is in use among the Eskimos of the present day, who have been identified by Professor W. Boyd Dawkins as the descendants of the ancient Cave Dwellers.

No one who did not understand its use would imagine the object for which it was made, and it looks entirely inadequate for such a task as separating the flint flakes from each other. In the hands of the Eskimos, however, it does wonders, and with a smart tap and a twist the flake is detached from its

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quantities of these primitive knives w
Such, indeed, is the case. A single
not often found, unless in
been transported from its o
the rule being that, wherev
has dwelt for any time, ther
plenty of flakes.

Not many years ago, w
was a new science, the disc
of ancient man were not
but ridiculed, and the fl
pronounced to be purely
ments, and such as could
two flints struck casual
other, or by the blows o
pickaxe.

Yet a flake of flint is a
of human art as is the
equally needs skilled labour.

It is not every flint that will pro
even if the right sort of flint be prod
strike the flake from
banging flints together
with a labourer's pickaxe,

violent blow is needed, nor is

last been struck

retained by the
seen from many
vered in the tombs.
almost exactly like

of the present day

Bronze Assyrian Knives.

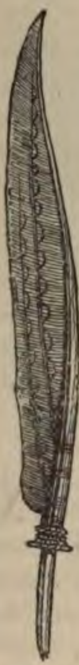
knives which occupy
g illustration, and the
blade of very much

h of blade was not
ngth was required, the
hort and thick flint-
dle. Many examples

of caps was exhausted, and yet they contrived to keep up their fire.

On examination of the weapons which had been dropped by dead warriors, it was found that they loaded their guns as usual, and then fitted the explosive tips of lucifer matches in such a manner that, when the trigger was pulled, the blow of the hammer ignited the match, and so drove the fire into the pillar.

However, as the negro insists on having the flint musket, the gun-flint trade, though sadly shorn of its former glories, is still in active operation. When we come to treat of spears and arrows, we shall find some wonderful examples of the forms that can be evolved out of flint by a knowledge of the lines of cleavage.



Bronze Knife.

It is but natural that, when the knowledge of metal working began to spread, knives, instead of being made of the fragile flint, which soon became useless, should be made of metal plates, the edge of which could be sharpened when it became blunt. It was equally natural that the shape of the metal knife should be copied from that of the flint-flake. If the reader will look at the metal knife here represented, and will then compare it with the "core" on page 101, he will see that the blade of the knife, which is a product of the Bronze Age, is an almost

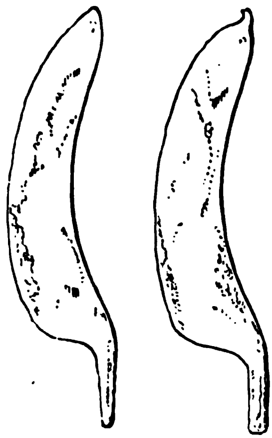
[redacted]

exact copy of the flake which has last been struck off the core.

The same flake-like shape was retained by the ancient Egyptians, as may be seen from many examples which have been discovered in the tombs. The bronze knives of Assyria are almost exactly like those of Egypt.

The well-known Spanish knife of the present day

Ancient Egyptian Knives.



Bronze Assyrian Knives.

is almost identical with the two knives which occupy the centre of the accompanying illustration, and the bowie-knife of America has a blade of very much the same shape.

In those cases where length of blade was not of much consequence, and strength was required, the obvious plan was to take a short and thick flint-flake, and fasten it into a handle. Many examples

of such knives have been disinterred from the spots where they have lain undisturbed for many thousands of years.

Some have been fastened into wooden handles; but in most cases the wood has decayed, leaving only the flint-blade.

Flint Knife with bone handle.

Flint Knife with deer-horn handle.

Sometimes, however, these predecessors of ours fixed the blades into handles of bone or deer-horn, which are less liable to decay. Even these implements have in some cases lain so long in the ground that all the animal matter has been extracted from them, and they were almost as fragile as if cut out

of dry chalk, and as light as if they were made of dry wood. Saturation with hot gelatine is the only means whereby these objects are restored to a sufficient density to endure handling. A rather remarkable variation of the chisel-knife is to be found in Australia, and is here figured.

The blade is formed of a flake of obsidian, a sort of natural glass, which is even harder than the flint, and possesses a keener edge when rightly split. The natives set great value on this obsidian, using it as an armature for their spears, and also as teeth for their saws, a number of small flakes being fastened in a groove set in the handle.

Knife or Chisel. Australia.

A large piece, such as is shown in the illustration, is too valuable to be broken up into saw-teeth, and is mounted upon a handle, so as to serve the purpose of a knife or a chisel as occasion may serve. The handle is entirely composed of string and fibre, the ends of the latter being frayed out and allowed to form a sort of tuft. This is the knife which is used for the purpose of cutting open a slain enemy and taking out the fat, to which the Australians attribute a superstitious value.

A knife of almost precisely the same materials and form is found in New Caledonia, and a very fine specimen is in the possession of the Rev. C. E. Shirley Woolmer, vicar of Ramsgate.

Supposing an iron blade to be substituted for the

obsidian, and much lengthened, the result would be the knife-dagger which is here represented, and which is the handiwork of a West African tribe.

The bronze dagger, which is here shown, has an outline almost exactly like that of the African or

West African Knife-dagger.

Bronze Knife-dagger.

Australian weapon, the chief difference being that the handle and blade are in one piece.

In several instances the chisel-knife, as this form is called, is ingeniously adapted to perform a double

task. A hole has been bored transversely through the horn handle of the knife, so that a wooden handle could be easily inserted, converting the knife into a small axe or hatchet.

Imperfect though these implements may be, they are evidently the precursors of our chisels of the present day, and were capable of better work than might be imagined from their clumsy form. As they

Axe-knife. Stag-horn and Flint.

Chisels.

were mostly used for cutting up the bodies of slain animals, or for manufacturing the simple tools and weapons that were then needed, we could hardly expect to find examples of the work which was done with them.

Such examples as we do possess are of the most extraordinary nature. We are accustomed to look upon art as necessarily a product of high civilisation,

and consequently the last people to whom we should look for art are the primitive races who had nothing better than broken flints for drawing implements, and nothing better to draw upon than the horns, bones, and tusks of the animals among which they lived.

Suppose that any of my readers were to be put in possession of a dead elephant, horse, or stag, by way of a drawing surface, and one of these flint-knives by way of a pencil, and were set the task of etching upon the horn, bone, or tusk, a portrait of the living animal to which it belonged, the results of his labours would be scarcely satisfactory.

Yet these ancient cave-dwellers were possessed of such true artistic genius that they overcame all the difficulties caused by imperfect material, and left for the admiration of a far-distant posterity a series of drawings which would do credit to our best animal draughtsmen. The truth and certainty of the lines are simply marvellous, and these unknown artists possessed also the gift of inspiring their figures with life. The three examples which are here given have been chosen because they afford portraits of three distinct animals.

The first of these illustrations is a much-reduced copy of a portrait of the extinct mammoth, drawn upon a fragment of its own tusk. Not only can it be recognised as a portrait of an elephant standing in the characteristic elephantine attitude, but our recent discoveries have shown that it is an exact portrait of the mammoth elephant, which was, therefore, a contemporary of the artist who drew its likeness.

The two principal characteristics of the mammoth were the great length and peculiar upward curve of its tusks, and the manner in which the body, especially about the shoulders, was clothed with long hair.

No one who had not seen the animal would have dared to invent a hairy elephant, the Asiatic and African animals having scarcely any hairs except on the ends of their tails. But the bodies of several mammoths have been found more or less imbedded in ice, and one of them is in so perfect a condition that the

Mammoth carved on its own ivory.

stomach still contained the fir-leaves and twigs which had formed its last meal before its feet were stuck in the mud, and it was overwhelmed with the ice torrent which preserved it for uncounted centuries.

All these animals possessed a double coating of hair, namely, a thick, close coat of soft fur next the skin, and another coat, so to speak, of long and coarse hairs. These hairs are truthfully represented by the artist who drew the sketch, and it is worthy of notice that he has given with equal fidelity the

arched curve of the back, the peculiar shape of the head, and the drooping folds of the large thin ears.

Several representations of the horse, belonging to the same epoch, have been discovered, one of which is given in the accompanying illustration. The artist seems to have amused himself by tracing on a piece of bone the various creatures with which he was familiar, just as an artist of the present day might cover a sheet of paper with miscellaneous sketches.

There is an eel, which is represented as being in the water. There is a human being carrying a burden on his shoulders, and there are two horses'

Horses' heads carved on bone.

heads. Here again, as in other drawings of horses, the discoveries of geologists are corroborated by the drawings of these ancient artists. Geology tells us that the horse of the present day is the last of a series of horse-like animals, found successively in the Eocene, Miocene, and Pliocene periods. The earliest horses, or rather, horse-like animals, had five distinct toes, and were scarcely larger than the jackal of the present day. Even when the true horse did make its appearance, it was not larger than a Newfoundland dog, was thick-necked and large-headed, was quite

unfit for the service of man, and was hunted, like the deer, for the sake of its flesh.

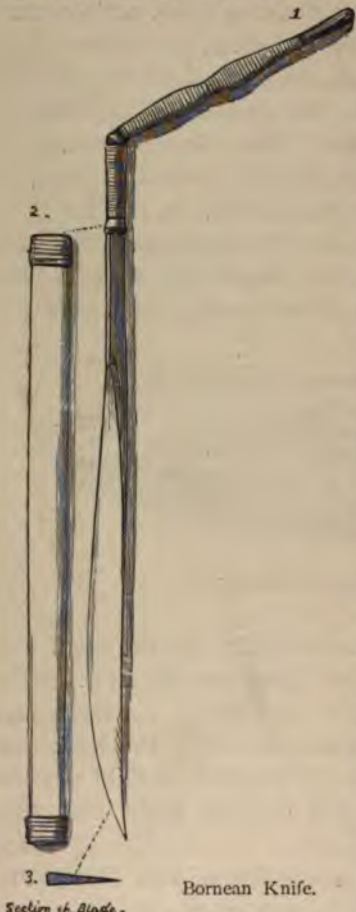
Another animal which these ancient artists were fond of drawing was the reindeer, a species which was almost identical with the animal of the present day. To these artists the reindeer afforded an infinite variety of studies. They have drawn it as standing still, as stooping to the ground to feed, as startled, as running, and as leaping. In one instance, a portion of a deer's antler has been shaped into a knife-handle, bent at an angle like that of the Bornean knife, which is shown on page 114.

Reindeer drawn on its own horn.

The rounded angle is occupied by the head and bent knees of a deer, which is represented as in the act of leaping. The muzzle is directed forwards and upwards, so that the horns lie along the neck and back, as in our illustration, while the straight portion of the handle is occupied by the body and out-stretched hind legs.

The conception and execution of this design are bold and masterly in the extreme, as can be appreciated by any one who has sketched a reindeer in different attitudes.

The horns, with their palmated branches, pointed antlers, and curved beams, are full of complicated detail, and to draw them correctly, both in detail and general effect, is by no means an easy task, even when the artist can use pencil and paper, and has the animal before him as a model. The difficulty is more than trebled when a flint-flake is the only pencil, horn or bone the only paper, and the animal is represented in violent action.



Bornean Knife.

I have already mentioned that the first knives made of metal are simply copies of their ruder predecessors, and that they more or less retain the original shape long after the models on which they were formed have been forgotten.

Here, for example, is a knife which is in common use among the Bechuana tribes. It is suspended

round the neck by a piece of string, just as is related of the Bosjesman on page 21.

Indeed, the Bosjesman seldom makes his own knife, his manual capabilities scarcely extending further than the manufacture of his reed arrows; and so he mostly obtains by barter a knife such as is here figured. It is of the simplest possible construction, being nothing more than a small flattened piece of iron, fastened into a handle made from the tip of an antelope's horn. This very primitive knife is, as the reader may see, an exact copy the flint-bladed knives figured on of page 106, the only distinction being that iron is substituted for flint.

Bechuana Knife (1).

When the Bechuanan can procure a longer blade, he forms it into a much more elaborate implement, fixes it into an ivory handle, and carves the hilt into the form of some animal, the hyæna and giraffe being the favourites.

As, moreover, the sharp point and edges of the knife might wound him dangerously in case of a fall, he guards the blade with a sheath made of two flat pieces of wood lashed together with raw hide. Then, as in using the knife he finds that he is much trammelled by the necessity of removing the suspending string from his neck when he wishes to use the blade, he fastens the end of the string, not to the handle of the knife, but to the upper portion of the sheath, and thus adds greatly to the power of the implement.

Now we come to an inevitable modification of the knife.

We have already seen how it originally takes the form of a short-bladed chisel. But, as man advances in civilisation, he is not satisfied with a flat blade. He has to cut grooves, and, not possessing any tool except the flat blade, he is perforce obliged to cut his grooves with straight converging sides, so that the transverse section would resemble the letter V.

Bechuana Knife (2).

But, such grooves are often inefficient, as anything which has to slide in them becomes pressed against the sides by its own weight, and is apt to stick or "jam." The really effective groove is rounded, and not angular, so that the section resembles the letter U, and a gouge, or round-bladed chisel,, is needed to produce it.

Our well-known gouges are simply chisels with their blades rounded instead of flat. Uncivilised man has, as usual, anticipated it—or I may rather say that the inventions of civilised man are only

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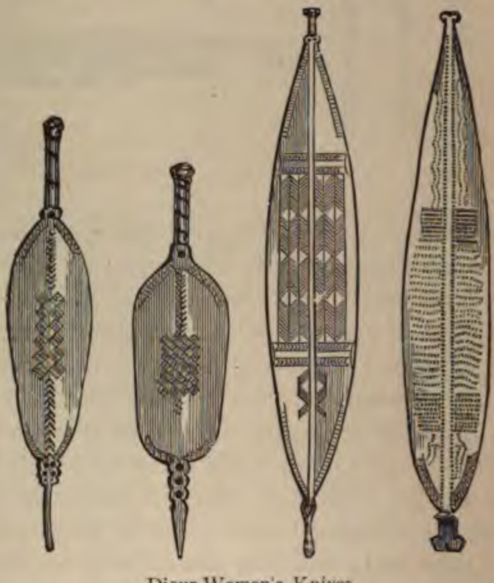
not so skilful as themselves. Djour bracelets, anklets, and ear-ornaments are in such request that they have long been acknowledged as currency; and indeed, if it were not for this currency, the Djour could never obtain their great luxury, *i.e.*, beef.

The dread Tsetse fly inhabits the district belong-



Djour Women's Knives.

ing to the Djour, and suffers no cattle to live except goats even the dog succumbing to its bite. So strictly limited is the range of this fly that the land of the Djour is surrounded by cattle-breeding districts, so that an industrious Djour can mostly purchase the beef which he cannot rear for himself.

Mr. Petherick, to whom we are indebted for our

[redacted]

knowledge of this remarkable tribe, states that every man is more or less a blacksmith, and can do more than our blacksmiths can, inasmuch as he not only works in iron, but smelts it for himself. There is plenty of iron ore in the country, and the land is exceedingly fertile. During a considerable portion of the year the Djour is an agriculturist. Here, again, the advantages of barter become manifest.

The inhabitants of the surrounding districts are almost exclusively pastoral, finding that their flocks and herds pay better than agriculture. The Djour, however, not being able to keep cattle, is a good agriculturist, and can produce crops that are not only sufficient for his own needs, but leave a surplus which can be exchanged for beef.

No sooner are his crops safely got in than the Djour turns his attention to metal-working. He builds a small blast-furnace of clay, almost exactly resembling in principle the furnace which is used at the present day. He makes his bellows out of two goat-skins, and, by a series of ingenious operations, obtains a number of small malleable ingots of iron. He cannot make steel, but his iron-work is really wonderful when we bear in mind the extreme rudeness and imperfection of the tools which he uses.

CHAPTER X.

THE DAGGER.

Development of the Knife into the Dagger—The dagger of the Middle Ages—The wooden dagger of New Zealand—Iron dagger with bronze handle—Balondo dagger—Indian daggers—The Coorg dagger and its form—A characteristic Indian dagger and mode of using it—The Kookery, or Ghoorka dagger—Its value as a weapon—The Ghoorka and the tiger—The Malay Kris and its variations—Mode of forging the blade—Story of a wise rajah—Bracelet-daggers of the Latookas.

THE reader may remember that at the beginning of Chapter V. I mentioned the extreme difficulty, not to say impossibility, of drawing lines of absolute distinction between certain weapons or implements.

The Knife affords a case in point. The flint-flake may become a knife or a chisel. If a long one, it may be modified into a saw, or, if shorter, into the head of a spear. If small, and with appropriate cleavage, it may be utilised as an arrow-head, and so forth. How the flint-flake was the origin of the knife and the chisel we have already seen, and we will now view it as the precursor of the Dagger.

In many cases, it is impossible to distinguish between the knife and the dagger, the same instrument being used quite impartially for either purpose. In

the middle ages, for example, every adult male carried a knife at his girdle. If he belonged to the middle or lower classes, the implement was called a knife. Yet, from its form and size, it was quite as formidable a weapon as the dagger, and was frequently used for the same purpose.

If the bearer were a knight, esquire, page, or man-at-arms, the weapon was called a dagger, though it was in daily use as a table knife. When a feast was given, the host did not trouble himself to provide his guests with plates, knives, or forks.

Forks, indeed, are quite modern inventions, and had no place at the tables of our ancestors. At dinner, the roast meat was brought to the guests on the spit, and every one cut off what he wanted with his dagger. If ladies were present, the gentlemen carved for them in similar fashion, the meat being conveyed straight to the mouth without passing through the formality of being placed on a plate.

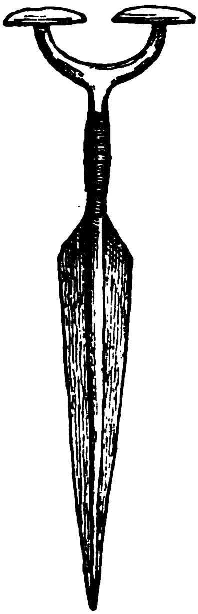
The sword was only used for battle, and was too heavy and clumsy to be worn within doors. But every one carried the dagger, which, as Messrs. Besant and Rice observe in their "Monks of Thelema," was much handier than the sword "if you wanted to stick anything into a friend over a bottle or a game at chess."

Thus, the Bechuanan knife (2) would, like the mediæval implement, answer either purpose equally well. So would the Bornean knife represented on p. 114.

The normal design of this implement, however, is really that of a cutting instrument, and the mode in

[redacted]

which it is used is almost unique. As a rule, the hilt of a knife is held in the hand; but, in this case, the long handle is tucked under the left arm, and there grasped tightly by means of its angular form, while the object to be cut is held in both hands and brought against its edge. Still, in case of necessity, the knife in question would be a very effective weapon.



Ancient Iron Dagger with bronze handle.

Now, however, we shall treat of the dagger, viewed wholly as a weapon, and not as an implement. The simplest dagger that can be imagined is a sharp stick, like the climbing stick of the Australian. The next simplest form is a stick flattened, double-edged, pointed, and with the but end trimmed into a handle. Such a weapon is the New Zealand dagger, which has long been disused.

When bronze and iron took the place of flint and wood, the weapon was little more than a copy of its predecessor. So, the iron blade of the composite dagger which is here shown is identical in form with the wooden weapon of the New Zealander. The handle and hilt of this

weapon are of bronze, so that it is a valuable example of a transitional stage of pre-historic manufacture, the cast bronze handle being united to a blade of hammered iron.

In West Equatorial Africa there is a sort of nation, or, rather, an aggregation of tribes which go under the collective name of Londo. As the prefix "Ba" is a plural designation, the word Balondo signifies the people who inhabit Londo land. This prefix

Balondo Daggers.

is almost general throughout Central Africa, so that we find such names as Ba Nyai, Ba Toka, Ba Kahi, Ba Ri, and the like. In some districts, the word Wa performs the same office, as is seen in such names as Wa Zavamo, Wa Gogo, Wa Nyamuesi, Wa Nyambo, &c.

The Balondo are a rather remarkable people,

They do not trouble themselves about clothing, one of their great chiefs, a female named Ma Nenko, utterly despising clothes as unworthy of a chief, and marching unconcernedly through torrents of cold rain.

But, though the Balondo do not require clothes, they are inordinately fond of ornament. They possess long and thick hair, and dress it in the most astonishing variety of fashions, the oddest of which is to plait the hair into a number of radiating tails, and then to fasten the ends of them to a wooden hoop, which encircles the head like the aureole of a conventional saint. They are excellent workers in iron, and display much taste in the manufacture of ornaments and weapons, two of which, together with their sheaths, are represented in the illustration. The peculiar forms of these weapons are almost identical with several examples of the Bronze Age, the long-drawn point and broad blade of the first weapon being very characteristic.

THE four weapons which are here represented are all of Indian manufacture.

The hilt of the first weapon is almost identical with that of the Balondo weapon which occupies a similar position in the preceding illustration, while the blade is like that of the second weapon, but slightly curved.

This weapon is of Coorg origin, and is in universal use. Every man carries it, the form of the weapon being identical, though the material will differ according to the position of the owner, the distinctions

belonging to the hilt and sheath, and scarcely at all to the blade. Thus the dagger of a poor man will have a hilt of plain wood and a rough scabbard of common leather, so that the weapon would only cost a few pence. But the great man of the district has his dagger hilt of ivory, and both hilt and sheath inlaid with gold and flashing with jewels, the weapon being worth four or five hundred pounds.

Indian Daggers.

The next weapon is peculiarly Indian, and, as far as I know, has no parallel in any other part of the world.

When used, it is grasped by the double cross pieces, the steel bars on the sides passing along the wrist, and so defending it against a sword-cut. This blade

[redacted]

is very thick towards the base, and is strengthened by a central ridge reaching nearly to the point. Like the preceding weapon, it varies much in point of ornament, but, as it is entirely composed of steel, and admits of no other ornament than engraving and high polish, the principal decoration belongs to the sheath.

Next comes a dagger which has been selected as exemplifying the development of a weapon from a very simple to a very elaborate form.

Nothing can be simpler than the primary form of this weapon. Two horns of the antelope are fastened together, with their bases crossing each other for about six inches. The crossed portions form the handle, and the two tips form the double point of the weapon.

Even in this primitive form it can do much execution; but, as the horn-points become blunted and are liable to split, they are replaced by the bayonet-like tips of steel, as in the illustration. Also a small hollowed shield of steel is affixed to the hilt so as to guard the hand.

So fond are the native armourers of this form of weapon that they sometimes abandon the horn entirely, making an exact copy of it in steel.

The right-hand weapon is mostly used by the Afghans, but has a very wide range, being found, with slight modifications, in Northern Africa. It is, in point of fact, little more than the Coorg dagger lengthened and narrowed.

HERE is another characteristic weapon, namely, the

Kookery of the Ghoorka tribe. The Ghoorkas are a very remarkable race. They are small of stature, the men scarcely exceeding five feet one inch in height, and are slight, wiry, and active.

Kookery.

They are dauntlessly brave, as our soldiers found to their cost when opposed to them.

Their national weapon, which is here figured, is

made by themselves from steel which they themselves smelt out of iron ore, and which is of excellent quality. The Kookery is extremely heavy, my specimen, which is a small one, weighing twelve ounces. It is very thick and heavy at the back, and, as the edge is kept as sharp as that of a razor, it can inflict terrible wounds.

On one occasion a native chief boldly asserted that one of his men could kill a tiger single-handed. The man was nothing loth, and, armed only with the Kookery, faced the animal boldly.

He first provoked the animal to spring at him, and, as it did so, he leaped aside, receiving on the edge of his weapon the blow which the tiger struck at him. The paw of the animal was nearly severed and hung helpless. The tiger, however, sprang round and flew at his enemy again. This time the Ghoorka had not to fear the terrible paw, and, as the animal passed him, he delivered a terrific stroke at the back of its neck and dropped it dead on the spot. Sometimes, as in the illustration, the Ghoorka delivers his blow at the tiger's throat instead of its neck. Before our soldiers became used to the Ghoorkas' mode of onset, they came off nearly as badly as the tiger did. The little warriors flung themselves on the ground, dashed under the muskets, so as to escape the bayonets, struck upwards at the bodies of the men, and did terrible execution.

They were just as formidable when opposed to cavalry, attacking the horses first, and then the riders as they fell, horse and man together.

Now, like other inimical native races, the Ghoorkas

Ghoorka and Tiger.

have become our allies, and are of the highest reputation as soldiers. They are, of course, armed with rifle and bayonet, but, in addition, every man carries his kookery, which is strapped behind him, and not at the side.

The reader will notice that attached to the sheath of the kookery is a sort of pocket from which projects a thong with a fringed end. This thong is attached to a supplementary sheath which can be drawn out by the thong, as at Fig. 3. In the smallest sheath are kept two small knives, which are shown at Figs. 4 and 5. These are used for domestic purposes, the kookery itself being reserved for war and hunting.

JUST as the kookery is the typical weapon of the Ghoorka, so the Kris (sometimes spelled creese) is the typical weapon of the Malay. Like the kookery, it is worn at the back, and not at the side. Several points are noticeable in this weapon. First comes the peculiar angle of the hilt. At first sight, this arrangement seems rather awkward, but it is in reality a perfectly effective one. When grasped for use, the handle is held by the thumb and three last fingers, the index finger lying along the blade, and being used as a guide for the stroke.

Another detail is the waving blade, which very much resembles the conventional flaming sword of the old painters when they depicted the expulsion of Adam and Eve from Eden.

Yet another detail is the mode in which a good blade

is forged. The brightly-polished surface which distinguishes the kookery, and which we expect to find in a valuable blade, is absolutely wanting. The steel is fibrous, and the fibres are arranged longitudinally.

In modern times, steel knitting-needles are exported from England into Borneo and other coun-

The Kris.

tries inhabited by the Malay race, and are there forged into very good kris blades. These, however, are not very much valued by the native connoisseurs, who will reject a fine-looking kris as worthless, while they will give very large sums for a blade which is of

the genuine old workmanship. In fact, the difference in price between the two blades may be paralleled by that between a Stradivarius violin and a new fiddle; and in either case an ignorant person would be sure to prefer the modern to the ancient instrument.

After the blade has been forged, it is laid in lime-juice for a time, the result of which is remarkable.

In welding together the needles of which it is made, the hammer obliterates their form, so that there is nothing to show the mode of construction. But the acid lime-juice bites deeply into the metal, and, when the rust is cleared off, the fibres stand out in bold relief.

So important is this restoration of the fibre, that in some weapons the acid bath has been used for so long a time that holes have been eaten completely through the blade.

As a necessary consequence, the edge cannot be smooth, as we expect to find in well-tempered steel, but is always more or less ragged. This very raggedness, however, is considered as adding to the efficacy of the weapon.

Like the sword of the last century, which is still retained in Court costume, the kris is a symbol of rank, and an old family kris is as much venerated as an old family sword among ourselves. The successive possessors of such an heirloom think it to be their duty to adorn the hilt with gold and precious stones, and even those of new family and much wealth will set up their gold-hilted kris as we set up our carriage. In his "Malay Archipelago," Mr. A. R. Wallace has a good story about the kris and its

manufacture. I should like to insert it entire, but our limited space compels me to condense it.

There was a Rajah of Lombock, who derived his income from a poll-tax upon each man, woman, and child. The tax was paid in rice, and was a very light one, but the Rajah found that year by year his income dwindled. Various excuses were made, such as sickness and death in one place, failure of the crops in others, and so forth.

But wherever the Rajah travelled he saw abundant crops, and the villages full of healthy people. Moreover, "he noticed that the krises of the chiefs and officers were getting handsomer and handsomer, and the handles that were of yellow wood were changed for ivory, and those of ivory were changed for gold, and diamonds and emeralds sparkled on many of them; and he knew very well which way the tribute rice went.

"But, as he could not prove it, he kept silence, and resolved in his own heart some day to have a census taken, so that he might know the number of his people, and not be cheated out of more rice than was just and reasonable."

The result of his deliberations was, that he issued a proclamation, saying that he had received a revelation from their tutelary god to the following effect. Plague, sickness, and fever were about to come on men and cattle, and there was only one mode of escape.

Twelve sacred krises were to be made and laid up in the palace. They must be made from contributions from the whole nation, one needle for each person. Then, if the plague should appear in a

district, the sacred kris contributed by that district should be solemnly carried there, and the plague would cease; but, if a single needle were missing, the kris would have no virtue.

So the head men of each village carefully collected the needles and sent them to the Rajah, who counted them, and wrote their numbers against the names of each town or village. Then he sent for the best armourer in the kingdom, divided the needles into twelve equal parts, and had them made into twelve krises before the eyes of the people.

So the Rajah, knowing exactly how many persons there were in each district, could no more be cheated in the poll-tax, and he consequently became richer and richer, instead of poorer and poorer. And, if illness appeared in a village, a sacred kris was sent. If the plague disappeared, great honour was paid to the kris. If the plague remained, the kris was taken back again, but still received honour, as having detected fraud on the part of the people.

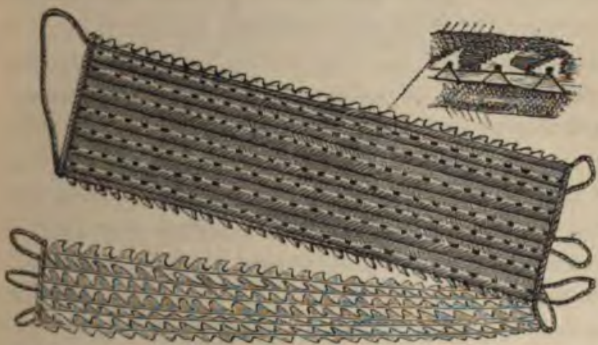
A most remarkable form of dagger is carried by the warriors of the Latooka tribe, of the country east of the Nile, and in latitude 40° N.

Not content with the sharp-edged bracelet, which the reader may remember is worn by the Djibba tribe (*see* page 97), the Latooka fasten five sharp double-edged daggers on the bracelet of the right hand. The man, therefore, can never be unarmed, even if he should drop his mace or his spear should be broken.

Identical in object with both these bracelet-weapons is the shark-tooth gauntlet of Samoa, one of which is here represented.

It is made of cocoa-nut fibre, and is armed with several rows of shark's teeth, set in the gauntlet much as they were arranged in the jaws of the fish. The teeth are fastened in the most ingenious manner, a hole being bored through each, as in the illustration. When worn, the arm is passed through the large loop at one end, while the fingers pass through the small loops at the other.

It is a remarkable fact, that, if the tooth-ribbon of



Shark-tooth Gauntlets.

a snail or a whelk be placed under the microscope, it displays rows of teeth that almost exactly resemble in shape and arrangement those of the Samoan gauntlet.

In his remarkable account of life among the South Sea Islands Mr. Mariner mentions a gigantic chief, who was accustomed to use these weapons after a very original fashion. The ordinary plan of attack is to strike at the face or lower part of the body; but this chief preferred a different mode of fighting.

He would rush at the enemy, clasp him with his gauntlets, and fling him to the ground on his face. Before the man could recover himself, the gauntleted wrists had clasped his head, while the foot was set on his back, and with a sudden wrench his back was broken. If the man happened to be comparatively small, this Samoan Goliath was accustomed to seize him and break his back across his knee, as we should break a stick.

It is not likely that the Hindoos should have known anything of the Samoans, but they have an instrument called the "tiger-claw," which is identical in principle. A slightly-curved bar of steel or brass has a ring at each end, so placed that when the index and little finger are passed through the rings the bar lies in the palm of the hand. Into the bar are set three carved knives, shaped like tigers' claws, and so arranged that they are concealed by the fingers.

It is mostly worn on the left hand, and is used for treacherous purposes, the apparently unarmed wearer embracing the victim with his right hand, and simultaneously ripping him up with the tiger-claws in his left.

CHAPTER XI.

THE SWORD.

Twofold origin of the Sword—Development from the knife—Pre-historic swords, bronze, iron, and composite—Bornean swords—The Parang—Scalps and charms—Ten Pigtails—The supplementary knife—Dislike to parting with it—A clever substitution—The Parang-Ihlang and its remarkable construction—Power of the weapon—Awkward for novices—The Parang-Latok—A severed pig—The Nubian and Abyssinian swords—Indian swords and mode of using them—Japanese swords—A Japanese executioner—Two-sworded officers—Swords and Art—The Razor-sword and its inventor—Shark-tooth swords.

STRANGE as it may seem, the SWORD has two distinct origins. On the one hand, it may be a much-lengthened knife; or, on the other, it may be a flattened club. I am inclined to think that the comparatively light swords which are wielded by one hand may be traced to the flint-flake, while the heavy two-handed swords derive their origin from the club. Be this as it may, the double origin is perfectly evident, and it is a remarkable fact that a well-known form of tulwar, or Indian sword, is almost identical in form with the two irregular boomerangs figured on page 87.

The three following examples of pre-historic swords have been chosen as exemplifying the gradual development of the sword from the knife and dagger.

The first specimen is almost identical in shape with the knife-dagger on page 122, except that the hilt is

of more elaborate structure. From the Bronze Age, we naturally pass to the next development in metal-

Bronze Sword. Iron Sword. Iron Blade. Bronze handle.

working, *i.e.*, the Iron Age. Accordingly, we find the weapon which is shown in the second illustration,

and which is very much like the straight sword of comparatively modern times. The "tang," or continuation of the blade, was evidently intended to pass through a hilt of wood, bone, or similar material.

Then, as the knowledge of bronze-casting would naturally survive among the iron-workers, we have, as we might expect, a combination of the two metals in the structure of the sword. The iron dagger with bronze hilt, which has been figured on page 122, has the ornamental portion of the hilt made on much the same principle as that of the bronze sword.

In the composite weapon, which is here figured, the shape of the bronze hilt is almost identical with that of the left-hand Balondo dagger which is shown on page 123. We shall presently find the same form in the handle of the Indian sword. To us this structure seems useful enough in a dagger, but singularly awkward in a sword. However, we shall see, when we come to treat of the Indian weapons, that the curiously and abruptly-widened hilt has its objects.

LET a weapon be made where it will, there is always something about it which tells its locality as plainly as if it had been labelled. No ethnologist would doubt for a moment that the sword which is here figured is of Malay manufacture. In point of fact, it was made in Borneo, and was brought thence by T. C. Grant, Esq., of Kilgraston, after his term of service under the first Rajah Brooke.

As may be seen from the illustration, the blade is simple enough, but the proprietor has decorated the hilt and scabbard to the best of his ability.

40

Bornean Parang, with charms.

The tufts which are fastened to the hilt at the end of the scabbard are composed of human hair taken from the head of a slain enemy; and in consequence a sword so decorated is held in the greatest estimation.

One of these swords was a most remarkable object. Attached to it were the pigtails of ten Chinese whom the Dyak warrior had killed. As is the case with some of the North American Indian tribes, and their scalp-bedecked weapons and clothing, these trophies of war must have been exceedingly inconvenient to carry. The average pigtail is five feet in length, and weighs more than half a pound; so that the mere weight must have made the weapon rather irksome to carry.

The sheath is carved with much artistic skill, and is highly polished. Attached to it is a second sheath, which contains the long-handled, short-bladed knife, which is shown at fig. 3. It is extremely difficult to obtain a weapon to which this knife is attached, as the natives appear to set a semi-superstitious value on it, and, if they part with the sword, will always, if they can, abstract the knife. In one specimen of the parang, the seller had ingeniously defrauded the buyer. After the sale had been completed, and the money paid, he abstracted the knife, and substituted unperceived a similar handle with no blade.

The little plaited bags, the tooth, and the feather are all charms by which the efficacy of the weapon and safety of the owner are insured. The oddly-shaped piece of flat wood is simply a sharpener, and is in incessant use, so careful is the owner to preserve the razor-like edge of the weapon. The

contrast between the polished and razor-edged blade of the parang, and the rough, channelled surface and ragged edge of the kris, is very remarkable.

There are three typical forms of Bornean swords. The second form, called the Parang-Ihlang, is so remarkable a weapon that I have here given a figure of it.

At first sight, even when it is drawn from the sheath, it does not present any great peculiarity. But, on examining it more closely, and especially on feeling it, the blade is seen to be convex on one side and concave on the other, as is seen by the section (fig. 5).

In every sense this is a most deceptive weapon. It does not look so formidable as the ordinary parang, but in skilled hands it performs the most astonishing feats. It can be used as an axe for cutting down trees, or a chopper for lopping off branches, as well as a weapon of war, and all without turning the edge. Mr. Brooke mentions that a man, who was a noted swordsman, severed, with a single blow of his parang-ihlang, a log of tolerably hard wood as thick as a man's thigh.

But the weapon has its drawbacks. Owing to the hollowed blade, the blow can only be struck in one direction, and if the wrong direction be given to the blow the weapon will glance off the object and wound the striker.

There are scarcely two weapons in which the hollowing of the blade is exactly similar; and, moreover, some are hollowed on the right and others on the left side; so that no experienced person will strike a blow with a parang-ihlang unless he be

Bornean Sword (Parang-Ihlang).

thoroughly acquainted with that particular weapon. Even the Dyaks themselves have inflicted dangerous wounds on their own limbs by the incautious use of the parang-ihlang.

The third characteristic sword of Borneo is called the "Parang-Latok," and is simply the angle-hilted knife (*see* page 114) very much magnified. It is the usual executioner's sword when the punishment of death is inflicted by beheading, and so powerful a weapon is it that a good swordsman can cut a living pig asunder with a single blow.

The natives are very proud of these weapons, as well they may be, and entirely contemn the feeble efforts of European sword-makers. Certain it is that in the bush, where every step has to be cut through the thick and tough vegetation, the best English blades were blunted and notched, while those of native manufacture were uninjured. Even the English officers, when they came to understand the use of the weapon, always carried the parang-latok for use, in addition to the Regulation sword, which they were obliged to carry for show.

A very remarkable variety of the sword is found in Nubia, and is here figured. The hilt is made of rhinoceros-horn, and the boldly-curved blade has its edge inside like a sickle. A very similar sword, called the "Shotel," is the national weapon of Abyssinia. The blade is nearly straight for eighteen or nineteen inches, and then suddenly curves inwards, so that its shape very much resembles that of the marpangye club of Australia, which is described and figured on page 26.

Perhaps the most beautiful swords in the world are those of India. Some of them are curved nearly as much as the Nubian sword, but have the edge on the outside. The mode of using these weapons will explain the small handle with its very wide hilt. If a European should try to strike a blow with one of these swords, holding it after our usual fashion, he would probably disarm himself, the edge of the hilt coming against his wrist, and so twisting the weapon out of his grasp.


Nubian Sword.

The handle, however, is not "grasped," as we understand the word, but is held as daintily in the fingers as a writer holds his pen. No "slashing blow" is struck, the edge of the weapon being swiftly drawn across the object of attack. So, if a horseman chases and overtakes an enemy, he does not strike at him as we should do, but delivers a sort of thrust, accompanied by a peculiar turn of the wrist, and the man's head falls off as if by magic.

In "The Talisman," Scott has exactly described the peculiar action which I have mentioned, Saladin applying the edge of the weapon to the object, and severing it with a turn of the

wrist. "Cutting the handkerchief," as it is now called, is almost always one of the feats which are performed at our assaults of arms, and a skilful swordsman will cut the handkerchief even when it is doubled fourfold and laid on the edge of the sword.


Indian Swords.

The two weapons which are shown in the figure belonged to the late Sir Hope Grant, G.C.B., who kindly allowed me to have them drawn.

Next comes another sword on which is stamped the distinctive character of the race which produced it. It is a Japanese weapon, and cannot be mistaken for that of any other country. The blade is narrow, scarcely exceeding an inch in width, is thick at the back, and then takes a sudden, wedge-shaped edge. It is not very highly polished, but retains that polish where our own sword-blades would be covered with rust.

As is the case with the Borneans, the Japanese are excellent connoisseurs in sword-blades, and set a very high value on the workmanship of certain renowned artists, especially those who lived some centuries ago. Although the Japanese sword has not the peculiarities of the Bornean

parang-ihlang, it yet requires skill in its management, and is handled as delicately as the Indian chief wields his curved scimetar.

For example, when a criminal is to be beheaded, the executioner does not raise his sword high in air and bring it down with a sweeping blow. The sufferer—he need not necessarily be a criminal —kneels on the ground, and holds his head over a hole about a foot in depth.

As he does so, the executioner pours a drop of water on the edge of the sword and lets it run off at the tip. He then places the edge of the sword close to the man's neck, and raises the point about a foot by a movement of the wrist, his arms being quite motionless, brings it down with a continuation of the movement, and the severed head falls into the hole. The entire business only occupies a few seconds.

The reader will remember that, in many cases of his-

Japanese Sword.

[redacted]

torical executions, two, or even three, blows of the axe were required to sever the head from the body, in spite of the weight of the executioner's axe, which was held at arm's length above the executioner's head. Indeed, to sever the neck at a single blow was considered a proof of great skill on the part of the headsman.

It is evident, therefore, that, if a comparatively light and narrow blade can perform, with a slight turn of a small man's wrist, a task which taxed the weight of a heavy axe and the full strength of a professional headsman, there must be something remarkable in the structure of that blade. It is probable that, before many years have passed away, the secret of the native armourers may be lost.

The Japanese are rapidly denuding themselves of their national characteristics. They are debasing their native art by imitating that of Europe, they dress in European costume, which does not in the least become them, and the quaint picturesqueness of the race will soon be a thing of the past. It will be understood, therefore, that I refer only to Japan as it used to be before these changes took place.

As with us in the last century, the wearing of a sword indicated a gentleman, but with the Japanese the possession of two swords was equivalent to a coronet. Both swords are similar in shape, but one of them is nearly twice as long as the other. The shorter weapon, called "waki-zashi," is about two feet four inches in length, while the longer sword, "katâna," is four feet long.

The latter weapon is strangely venerated. It has a special stand for its reception at home, and when its owner pays a visit he takes his sword-bearer, or page, with him. When he is welcomed by his host, he removes the katâna, and lays it horizontally in the hands of his kneeling page, who has previously thrown a piece of fine silk over both his hands.

The exquisite finish which is given to these weapons is beyond all praise. There is no show about them. There is no sheen of burnished gold or sparkle of glittering jewels; but every detail of the weapon is a work of art. The guard is adorned with the most lovely inlaid work, no two being alike. One of these guards represents a herd of horses in full action—leaping, trotting, and prancing at liberty, and tossing their manes and tails in all directions. So minute is the work, that its full beauties cannot be seen without a magnifying-glass.

The smaller sword always has a knife which fits into the sheath, just like that of the kookery or parang. In my specimen, the knife-handle was adorned with a crayfish embossed in gold. The figure must have been modelled from a natural specimen, every detail being minutely perfect, even the joints of the slender antennæ being marked. The handle of these swords is covered with the rough skin of a species of skate, and a firm hold is insured by the silken string which is artistically plaited over it.

Again a characteristic sword.

This very remarkable weapon belongs to a special company of the Amazon Life Guards of the King of Dahomé. This regiment of unsexed women

is divided into various companies, the most celebrated of which is the Razor Company. The weapon with which these women are armed is nearly four feet in total length.

It is an evident imitation of the English razor, and when in use the blade is kept open by the trigger-spring at the back. This weapon was invented, or, rather, modified, by a brother of the late king, Gezo.

In connection with this gigantic razor, I may mention that in the South-Western States of America, where the revolver and bowie-knife are

Dahomé Amazon Razor-sword.

still in constant use, the negro also goes armed, his weapon being invariably a razor. Many of the comic paragraphs in American newspapers are based on this custom.

I HAVE already mentioned that the nature of a weapon necessarily depends much on the productions of the country where it is made. Man, having a need for edged tools, will naturally supply himself with these necessaries in the easiest way. He has the flint, the green-stone, and the obsidian; but all these materials are hard to work, and much time has

to be expended before an effective cutting instrument can be made. Now, the teeth of the shark are naturally made cutting instruments, which can be fastened to a handle without much trouble, and it is not to be expected that mankind would neglect such obvious advantages as they offer to him.

We know that sharks abound in the tropical and semi-tropical seas, and we may therefore take for granted that the semi-civilised inhabitants of island groups which stud those seas would use the shark's tooth in giving edge to their knives or swords. On p. 67

Kingsmill Island Swords.

has already been shown an example of the shark-tooth weapon, and a glance at the two swords here illustrated will show that the maker dwelt near the shores washed by a tropical sea, no other seas producing sharks large enough to furnish such teeth.

In point of fact, these weapons came from the Kingsmill Islands, a group of islands north-west of Samoa, and at about fifteen miles' distance from them.

There are generally two modes of fastening the teeth to the handle of the weapon, both of which are shown in the two swords which are here figured. In the left-hand weapon, a groove is cut on either side of the wooden blade. The base of each tooth is inserted into the groove, and, a hole being bored through the wood and the tooth, the latter is fastened by a plaited string made of cocoa-nut fibre.

The branched sword is made in a slightly different manner. Instead of cutting grooves, the maker has lashed two narrow pieces of thin wood to the blade, leaving just sufficient space between them for the reception of the teeth. Holes are then bored as before, and so the weapon is armed with these formidable accessories. The teeth of a shark can cut like a knife, this cutting power being greatly increased by their serrated edges.

When we come to the Spear, we shall find more examples of shark-tooth weapons.

CHAPTER XII.

THE AXE AND ADZE.

Primitive axes—The Australian tomahawk—Its use in tree-climbing—Stone tomahawk of North America—Prehistoric axes—The flint axe—Mode of fixing the head in the handle—The iron axe—Axes of tropical Africa—The Ba Nyai and their axes—Elephant-hunting—The adze-axe—The adze—New Zealand adzes—New Zealand art—Prevalence of the human form and face—Glittering eyes—The jade chisel—Bronze axes and adzes—The "Celt"—Attachment to the handle—The Bornu spear—Spear of the Israelites—Abner and Asahel—Mould for casting the celt—The double-headed axe of stone and metal—Ancient Danish arms.

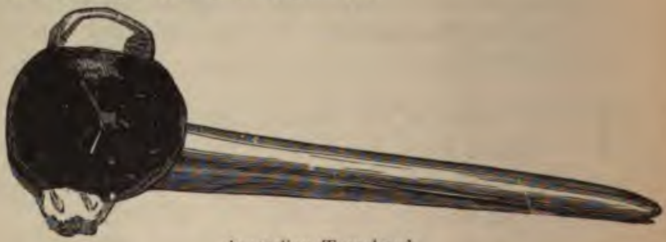
THE increase of cutting power which is attained by a sharp-edged tool, fastened to the end of a stick, and at right angles to it, has evidently been known to man from the very earliest times.

In most cases the handle has perished, and nothing has been left except the blade; but in some instances the complete instrument has been preserved, so as to give a clue to the structure of weapons which have only partially withstood the ravages of time. We will first take some of the axes which are used by uncivilised mankind of the present day. Then we will compare them with their predecessors, and lastly will trace their gradual development into the perfected implements of the present day.

We will begin with the small axes which are used by one hand only, and which go by the general name of "Tomahawk."

It is impossible to conceive simpler forms of tomahawk than the four specimens which are here figured.

The first form is nearly universal throughout Australia. It consists of an elongated stone, having both ends sharp, and fastened to the handle by "black-boy" wax, a sort of gummy secretion from the "black-boy" grass-tree. According to our ideas, it is a most insignificant implement, and of little use. Yet, armed with this simple weapon, the native can climb the largest and smoothest trees in search of the animals which supply him with food, and which seek safety from their enemies.



Australian Tomahawk.

A tame native, for example, pointed out to his English master a "bear," *i.e.*, a koala, which was trying to hide itself among the boughs. The man had no weapon except the little tomahawk, but that was quite sufficient for him. "Mine pi him cobbera direckerly" (I'll knock him on the head directly), said the man, and in a few minutes he had made his word good, the koala falling dead to the ground.

When a native ascends a tree by means of the

tomahawk, he acts much as he does when using the "warpoo," a small pointed stick which has been described on page 25. With a couple of smart blows—just like a postman's conventional knock—a deep notch is made in the trunk. Another notch is then cut, about eighteen inches above the other, and a foot or more at one side. These notches receive the great toe, and, by continuing to cut them, the man ascends the tree almost as quickly as if he were mounting a ladder.

Of course, the notches remain in the tree-trunk

Australian Tomahawks.

after the man has descended, and it might be imagined that, if another native had to climb the same tree, he would be only too glad to use the notches already made. But so little trouble does the task of cutting the notches cost the native, that he always prefers to cut a fresh set for himself.

In the preceding illustration, the stone head of the tomahawk is not fastened by being imbedded in black-boy gum, but by lashing it to the handle, or by twisting a flexible handle round it, and then lashing the ends of the handle together.

The accompanying figure of an ingenious tomahawk-handle is drawn from a specimen in the British Museum, which has absorbed the magnificent collection once called by the name of its original possessor, Mr. Christy. It was made by a North American

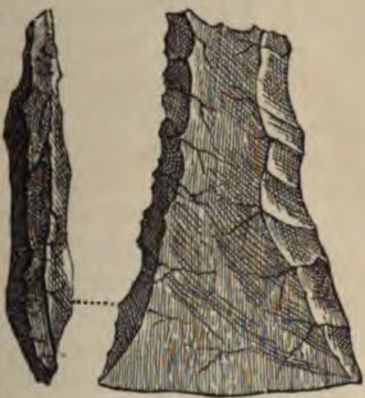
Stone Tomahawk.

Indian, in days long gone by, and such a weapon has not been manufactured for more than half a century, its place having long been taken by iron tomahawk-heads, which were imported from England, and exchanged for furs of many hundred times their value. One of these imported weapons will be described in another portion of this work.

Any of my readers who have watched a blacksmith at his forge will remember that many of his chisels and punches are held in handles of precisely the same

structure, the middle of a flexible withy being twisted round the tool, and the two ends of the withy acting as a handle.

This last mode of attaching the axe-head to the handle could only be used when the former was rounded and furnished with a groove in which the twisted handle could be received. If, for example, such an axe-head as is here shown were to be fastened into a flexible and twisted handle, it would work its way out again before many blows had been struck with it, and, moreover, the sharp edges of the flint would soon cut the handle to pieces.



Flint Hatchet.

Some other mode of attachment must, therefore, be invented, and by great good fortune a few ancient axes have been discovered which are in sufficiently good preservation to show how ingeniously the prehistoric tool-maker had constructed the implement.

The handle was made of wood, and had an enlarged end, much like that of the Australian waddy. Into the wood the maker inserted the base of a deer's horn, and fastened the base of the axe-head into the horn, thus forming a very effective instrument.

When iron superseded flint as an axe-head, it was

Compound Axe.

Iron Axe.

but natural that the metal instrument should be shaped upon the model of its stone predecessor, and that it should be fastened into the handle after a similar fashion. One of these ancient axes is shown in the accompanying figure, and it is a curious fact that among the uncivilised races of men the axe-head almost invariably passes through the thickened wood of the handle. Captain Burton, who has had an almost unparalleled experience of implements and weapons in various parts of the world, boldly asserts that this mode of attaching the head is far superior to our fashion of passing the end of the handle through the metal socket of the axe-head.

The accompanying illustration shows the axe which is generally in use among the Ba-Nyai tribe, and also depicts the mode in which it is carried. As it was intended to be wielded by a boy, the implement is a small one.

A man's axe is a very formidable affair, and is so large that, at a little distance, it might be taken for a scythe. Such an axe will

have a head measuring more than a yard in length, and its handle will sometimes be six or seven feet long.

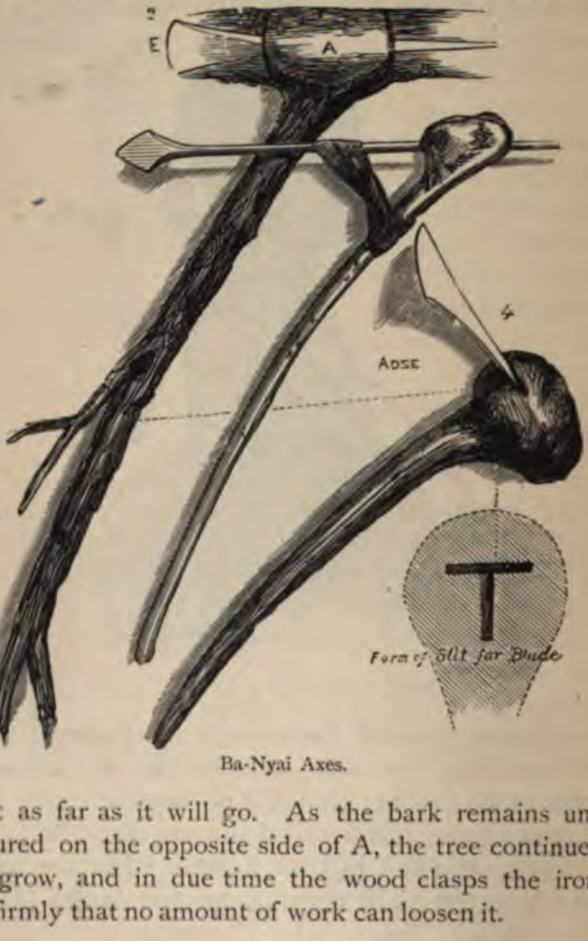
The fine tribe that goes by the name of Ba-Nyai, or the Nyai people, are very excellent blacksmiths, and make a wonderful variety of axes, each having its

Ba-Nyai boy carrying the Axe.

special use. Three of these forms are given in the accompanying illustration, each having been chosen for the sake of some peculiarity of construction.

I have already mentioned that some of the African axe-heads are fixed in their handles while the tree is still growing. The uppermost figure in the illus-

tration shows the process. A represents the branch to which some smaller boughs are still attached. After it has been roughly cut into shape, and a slot cut through it, the iron head, E, is forced into the



Ba-Nyai Axes.

slot as far as it will go. As the bark remains uninjured on the opposite side of A, the tree continues to grow, and in due time the wood clasps the iron so firmly that no amount of work can loosen it.

When the maker judges it to be sufficiently fixed, he cuts off the principal branch, trims the wooden portion into shape, and removes the small boughs so as to make a smooth handle. In order to realise the process better, the reader is recommended to turn the book so that the edge of the axe, marked E, is uppermost. The branch will then be in its right position.

The next axe, which has a spear-shaped head, is used for elephant-hunting. I may mention here, that, in order to save the space, only the upper half of the handle is given, its full length being from six to seven feet.

The Ba-Nyai are an active and courageous race, and two of them will undertake to kill, or, at all events, to disable, an elephant.

The two hunters start off in search of an elephant with good tusks, one of them carrying the axe, and the other nothing except, perhaps, a stick or a spear. When they have found an elephant worthy of their steel, they separate widely, the axe-man keeping behind the elephant and entirely out of sight, while the other is well ahead.

At a preconcerted signal, the spear-man begins to agitate the bushes, so as to draw the elephant's attention, while every now and then he shows himself for a moment, so as to puzzle the animal and make him undecided whether he shall attack or retreat.

While this by-play is going on, the axe-man steals up silently behind the animal, and when he is within reach deals a blow at the back sinew (Achilles' tendon) of the hind leg, which, in the elephant, is

within a few inches of the ground. The animal is then powerless. An elephant requires all its legs, and is not, like many animals, able to charge on three legs if one be disabled. Sometimes the tendon is not quite severed by the blow. This is, however, of little consequence, as, owing to the vast bulk of the animal, the tendon is sure to snap as soon as the weight is thrown on it.

The remaining axe (fig. 4) is worthy of notice, on account of its ingenious adaptability to circumstances.

Instead of fixing the head into a growing bough, the maker chooses a stout and well-seasoned branch, and, after trimming it into shape, cuts a double slot, like the letter T. If he wants the tool to act as an axe, he places the iron head in the upright slot. But he may want it to act as an adze, and in that case he places it in the cross slot, thus saving himself the trouble of making two tools.

Bornean Adze-axe.

It is worthy of notice that a totally distinct race, inhabiting a different quarter of the globe, has hit upon the same idea of converting at will an axe into an adze, but has carried it out in a different way. The lashing, which fastens the head to the handle, is made of narrow strips of rattan, like those which are used in our cane-seated chairs. Owing to the stiff elasticity of the rattan,

Bechuanan Battle-axes.

the lashing retains its form when the head is removed. Now, the ingenious workman has managed to forge the head in such a manner that it fits equally well into the lashing, no matter whether it be laid parallel to the handle, so as to act as an axe, or across it, so as to become an adze.

This ingenious implement is made by the Water Dyaks of Borneo.

The axes which are here represented are all intended for military use, and are made by the Bechuanas—more correctly, the Ba-Tchuana or Tchuana men. These people are far in advance of many African races, regulating their public affairs by a sort of parliament, building houses with no small architectural pretensions, and being good workmen in iron.

Some of their spear-heads are really wonderful examples of semi-savage workmanship, as we shall see in the course of the work. At present, however, we can only deal with the native axes.

Their wood-cutting axe resembles so closely that of the Ba-Nyai that it needs no description. The shape of all these axe-heads is evidently based upon the head of a spear. Fig. 2 has the head of an unbarbed spear, while in fig. 4 the head is that of the barbed spear much enlarged. Fig. 3 recalls to the mind the form of many mediæval weapons, but, if analysed, is evidently the upper half of the barbed form.

The battle-axe which is most prized by the Bechuanas is that which has the handle made of rhinoceros horn, its weight giving it force, and its toughness preventing the handle from being broken

in battle. When the Bechuana warrior goes to war, he always carries one of these axes inside his shield, and, as soon as he has flung his spears, snatches the axe and rushes to close quarters.

WE now come to the Adze, *i.e.*, an axe with the blade at right angles to the handle. We have already seen how an axe can be temporarily converted into an adze, and we now have to treat of the adze itself.

New Zealand Axe.

It is a remarkable fact that in all the islands of the tropical seas the axe is very seldom seen, while the adze, in various forms, is universal among them. Mostly, it is quite plain, as is the instrument which is here figured, while in other cases the wooden portion is most elaborately carved and otherwise adorned. In all cases the head is fastened on the same principle, and in many instances the maker has not been content with merely insuring the attachment of the

head, but has woven the lashing-strings into the most intricate and beautiful patterns.

Tahitan Adze (1).

In the New Caledonian adze which is here figured, the maker seems to have been a novice in his art. He has merely split the head of the handle,

Adze of New Caledonia.

pushed the flat piece of green-stone into the aperture, and then lashed it together in a very clumsy and inartistic fashion.

One of the commonest forms of this implement is shown in the accompanying figure, and is a very good example of the typical islander's adze. The upper part of the handle is cut so as to

make a sort of ledge in which the stone lies, and which receives the shock of each blow.

Sometimes the maker has lighted upon a piece of specially valuable stone, and wants to make the best of it. The fragment is too large to be wasted as a knife, and too small to form the head of an adze. So the ingenious workman first adapts the fragment to a piece of wood so as to bring it to the requisite size

Tahitan Adze (2).

and shape, and then lashes this composite head to the handle. An example of this very ingenious implement is given in the illustration.

In some of these adzes the very handle is covered with small and elaborate, though not intricate, patterns. I had often wondered how these semi-savage artists had insured the accuracy of their patterns. The difficulty was solved by coming into possession

of the implement which is here figured, and which came from Mangaia, one of the Hervey Islands.

The original possessor had evidently intended to cover the handle with ornamental carving, and had taken the precaution of designing the entire pattern before he began to carve it. He has drawn the pattern with a sort of black dye, which is so permanent that the whole of the design is quite clear and distinct, although the implement had gone through much rough usage and neglect of many years' standing.

Adze, Mangai.

The handle of this adze is painted with the pattern which is intended to be carved upon it.

Sometimes a skilful workman will employ himself for years in the production of an adze which is not intended for use, but simply as a proof of the artist's powers in stone-grinding, wood-carving, and string-plaiting. A very fine example of these ornamental adzes is here figured. When it came into my possession, it was said to be a New Zealand idol, though, as the reader will presently see, there is not a single characteristic of New Zealand about it.

The wood of which it is made is yellowish in colour, hard and heavy, so that, as its length is nearly four

feet, its weight is very considerable. The ornamental base is hollow, so that the body of the adze is supported by a number of very narrow pillars, each of which is carved into a diapered pattern on the outer surface. Considering that the workman had nothing better than a stone chisel wherewith to work, it is really wonderful that he could have achieved such a task.

Mangaian Adze of Ceremony.

The body or shaft of the adze is solid, and the whole of its surface is covered with ornamental carving, which looks very much like the outside of a pineapple. The blade of the adze is of very large size, and, in spite of the hardness of the material, has been ground down by patient labour until it was worked into form.

Lastly comes the beautiful string-plaiting by which the head is lashed to the handle. Wishing to show the kind of work which could be produced by cocoa-nut fibre, the maker began this department of labour by plaiting, from very fine cocoa-nut fibre, a quantity of flat string, or rather braid, the plait not being wider than ordinary packthread. After wrapping the base of the stone in bark cloth, he has lashed it firmly to the handle, weaving the plaited braid into a most intricate and deceptive pattern. There is really but a single layer of this braid, but the dusky artist has contrived to interweave the strands so artfully that to the eye they produce the effect of four distinct layers.

The four following illustrations represent the most characteristic forms of New Zealand adze. As the reader will see, there is no resemblance between New Zealand carving and that of Mangaia, and, in fact, the New Zealanders' only rivals in artistic wood-carving are the Marquesans, whose peculiar form of club has already been mentioned, and the Solomon Islanders, who lavish a wonderful amount of artistic carving on the heads of their canoes and the interior of their dwellings.

There is much patient labour in the Mangaian carving, but very little real art, whereas the New Zealander is a born artist, and covers his houses, his treasuries, his canoes, his adzes, and his household utensils with the boldest and most fanciful designs. We have already seen how the New Zealander decorates his wooden merai, and we will now see the kind of ornament which he bestows upon his adze.

He does not, like the Mangaian, cover the handle with engraved patterns, but leaves it altogether plain, and reserves the decorations for the head and the butt-end of the handle.

The first figure, which was drawn by Mr. Angas while in New Zealand, is that of a singularly fine specimen of native art. The maker was fortunate enough to procure a piece of the precious green jade

New Zealand Green Jade Adze and Chisel.

large enough for an adze, and evidently determined that such a gem should have a worthy setting; for so valuable is this jade, that an ear-pendant, hardly larger than a man's little finger, cannot be procured, even in New Zealand, for less than forty shillings.

One notable character in New Zealand carving is the prevalence of the human form or face. Sometimes, as in this jade-axe, the human figure is given

in its entirety, and is very conspicuous, but in others it is treated conventionally, and so mixed up with the flowing and graceful curves of native art, that a person who is unacquainted with this mode of treatment can seldom detect these conventional figures until they are pointed out.

New Zealand Stone Adze.

Whatever may be the object which is carved, the human face, whether conventional or realistic, is sure to find a place.

The reader will remember that the head of the E'hani sceptre is a much conventionalised representation of the human face and tongue. The native carver is never quite happy until he has not only introduced the human face, but made the eyes very conspicuous by inlaying them with the shining nacre of the ormer-shell.

It often happens that he has so disguised his conventional figures and faces by interweaving them among the pattern, that they might have passed unnoticed had it not been for the glittering eyes. These eyes are mostly to be found in the E'hani,

and they are very conspicuous in the two previous figures.

In this Stone Adze there are no less than six of

Adze of New Zealand.

these shining eyes, all of which, when viewed from their front, are seen to belong to grotesque faces.

A very good example of this custom is given in the third adze, two views of which have been drawn so as to show the manner in which these concealed and conventional faces come into view when the object is seen from different aspects. In the profile view, one human face is visible just under the stone head, where it looks much like the termination of a mediæval corbel. It is a favourite spot for the introduction of the human face, and another example of it may be seen in the preceding illustration.

Now, if the reader will turn to the right-hand figure, which gives a back view of the same implement, he will see that the upper half is one of the conventional human faces. First comes the forehead, with its diverging spirals, representing the tattoo-marks of a warrior. Then come the two eyes, and immediately beneath them are the curves representing the tattooing of the cheeks. Below them is represented the widely-opened mouth, with the tongue lolling out of it.

Had the Maori artists been in possession of steel knives and chisels, their work would still have been very creditable. Indeed, it would not be easy to find an European, who, unless he were a professional artist, could design and execute such carvings out of hard and solid wood or bone, even if he were allowed the use of a chisel and a knife. Yet the Maori contrives to perform his artistic task with no better tool than a fragment of stone, or, if he be very fortunate, of jade, fastened into a wooden handle.

[redacted]

In order to give a better idea of the Maori's skill in executing these sculptures with such insufficient means, one of the chisels is represented, together with the ornamental adze-handle. Being of jade, it is a specimen of the best tool that a native artist could have at his disposal, and I think that even a professional wood-carver, though he came from Warwick or Switzerland, would not produce work of a very high order if the only tool at his command were a sharp stone set in a handle.

NOW we will revert to pre-historic man, and see how the axe and adze of metal took the place of the implements made of stone.

Bronze objects, such as are here represented, are frequently discovered in ancient tombs or on the sites of ancient settlements. They were generally known as "Celts," and were, for a long while, supposed to have been the spud at the but-end of the spear, such as is still in use among the Bornu cavalry, and such as was enjoined by the Mosaic law upon the Israelites who were fortunate enough to possess a spear, or even an ox-goad (see Deut. xxiii. 13).

This sharpened end also enabled the owner of the spear to stick it upright in the ground when he was not using it, just as an angler of the present day does with his rod. So, when Saul lay sleeping at the hill of Hachilah, his spear was stuck in the ground close by his head (1 Sam. xxvi. 7).

Again, when Asahel persisted in chasing Abner, in spite of the latter's remonstrances, " Abner, with

the hinder end of the spear, smote him under the fifth rib, that the spear came out behind him, and he fell down there and died in the same place." Abner was evidently carrying the spear horizontally, or "at the trail," so that without stopping his course he could deliver a back-blow with the sharp-edged spud at the butt of the spear.

Bronze Hatchet, with Socket and Ear.

Bronze Hatchet.

Without saying that the "celt" was never used for this purpose, modern archæologists have found certain objects in a sufficiently complete state to show the mode in which these "celts" were used—those, at least, which possess a sort of staple at one side. It was evident that the object of the staple was the attachment of the metal head to the handle, but it

was not until late years that the true use was discovered. The accompanying illustration shows at once the mode of attachment. A sharply-bent branch was chosen as the handle, and the head was then fixed to the end, which was pointed in order to make it fit the socket. Cords passing through the staple and fastened to the handle retained it in its

Bronze Axe and Handle.

Mould for Bronze Hatchet.

place. A very similar mode of attachment is seen in the figure of the elephant-axe on page 160.

Not only have these axe-heads and their mode of attachment to the handle been discovered, but even the moulds have been found in which these objects were cast. They are cut out of stone, and are in two pieces, just like our own mode of casting at the present day. The round holes which are seen round the

mould are intended as guides whereby the two halves are made to fit each other exactly.

In the double-headed stone axe which is here represented, we find a wonderful improvement on the flint axe which was described on page 157.

It belongs to the Neolithic Age, *i.e.*, the period when man was not content with the rough-and-ready implements which could be obtained by chipping a flint or rubbing a flat stone to an edge. He began to take a pride in the appearance of his weapons, and not only polished their surface, but gave them an artistic outline.

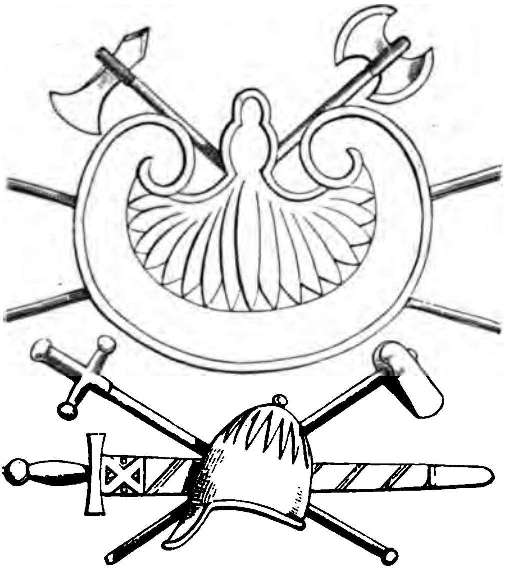
Stone Double-headed Axe.

Such a weapon as that which is shown in the illustration must have been ground by patient labour out of a stone of much larger dimensions, and, before he began his task, the workman must have conceived in his mind the graceful outlines of the weapon which he intended to produce.

This weapon introduces another element into axe-making, the handle passing into a hollow in the head, whereas all the previous axes except those of the celt form have the head passing through a hole in the handle. Even in the celt, there is no hole piercing the head, the latter being extended and hollowed so as to form a socket into, and not through, which the handle passes.

[redacted]

That so graceful a form as this double-headed axe of stone should be copied in metal is only to be expected, and so we find in the ancient legends of Northern Europe the double-headed axe continually

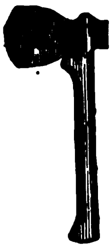


Ancient Danish Arms.

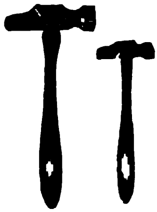
mentioned as the favourite weapon of the legendary heroes.

In the double-headed axe represented in the accompanying illustration we find an almost identical

weapon, with the handle passing through the head. The single-headed axe below has the head attached to the handle in the same manner, while the upper left-hand axe has the head passing through the handle, like the African axes, which have already been described. In this weapon also, we find an approximation to the axe-hammer, which is so familiar a tool in this country.



Axe hammer.



Hammers.

CHAPTER XIII.

THE SPEAR.

Primitive form of the weapon—Ranjows and their uses—Pre-historic ranjows—The stakes of the mediæval archers—Bills and bows—The flint-headed spear—Australian spears—Workers in obsidian—Development of the flint spear-head—Serrated blade—The flint-polisher—Spear-heads of metal—Attachment of the head to the shaft—Bronze and iron—Cast and hammered iron—Superiority of the latter—A pre-historic genius—Semi-savage steel-workers—The Zulu blacksmith and his tools—The assagai of South Africa—Its peculiar form and various offices—The stabbing assagai and its inventor—Origin of the Zulu kingdom—Chaka and his military system—"Parma non bene relicta"—Assagai-throwing—The Koveh or Torture-spear of the Bechuanas—Superiority of Bechuanan iron-working and its probable cause.

IN its primitive state, the spear is nearly as simple a weapon as the club. All that is required is a long and fairly straight stick, and a flint-flake with which one end can be scraped to a point. If the point be hardened in the fire, a very effective spear will be the result.

In Borneo and other bamboo-producing countries, a long bamboo with one end cut off diagonally is a very common form of spear, the silex with which the surface of this gigantic grass is covered affording not only a point but an edge.

The well-known "ranjows" with which the Chinese soldiers cover their retreat are only very small spears.

They are strips of bamboo, some two feet in length, cut off diagonally at each end. Each soldier can make a dozen in half as many minutes, and in consequence of their lightness can carry them without being fatigued by their weight. When a retreat is ordered, the men stick their ranjows in the ground, about a yard apart, so that it is impossible for the pursuers to charge over the ground until the ranjows have been removed.

During one of the Chinese wars a remarkable incident occurred. The Chinese had been obliged to retreat, and, as usual, protected their rear by ranjows. It so happened, however, that the retreating force was met by another body of the enemy who had worked their way round to the former rear. The result was that the Chinese were driven back over their own ranjows, and so fell victims to their own device. One of the illustrated journals produced a most grisly sketch of the ranjows and their victims, the latter hanging impaled on the bamboo spikes in the most curious and horribly grotesque attitudes.

The reader may remember that, when the bow was the national weapon, each archer was supplied with a strong doubly-pointed stake as a protection against the enemy's cavalry. One point of the stake was thrust into the ground so that the other inclined towards the enemy. The stakes were set six feet apart, so that archers could shoot over and between them, and, if the enemy should charge, the bowmen

[redacted]

knelt down and held the point of the stakes in their hands, just as our soldiers hold their bayonets when ordered to resist cavalry.

The "bill-men," armed with their long-handled and heavy axes, then advanced between the rows of kneeling archers, and did terrible execution among the horsemen as they were harassed by the pointed stakes. Hence the well-known call to arms, "Bills and Bows," the two forces acting together.

The pre-historic races, by the way, used the ranjows in protecting the approaches to their forts.

JUST as we might naturally look in Australia for the primitive club, so we might there expect to find the primitive spear. Very many of these weapons are nothing more than pointed sticks, but the most effective are those which have their heads cut into barbs or armed with flint and obsidian.

Examples of the simply barbed spears are Figs. 1, 2, and 7 of the illustration on page 184. At Fig. 3 there is an example of a very effective barb which is obtained by lashing a curved and pointed piece of hard wood to the head of the spear. Fig. 6 shows a spear which has the head armed at each side with little fragments of obsidian, which cut like lancets, while Fig. 4 shows a spear with a head made wholly of flint, while the weapon shown at Fig. 5 has its head made entirely of obsidian.

The skill of these savages in working obsidian is really wonderful. It is comparatively easy to strike flint-flakes from their bed, but to produce similar

Heads of Australian Spears.

flakes from so obdurate a material as obsidian is quite a different business. Yet these people seem to work obsidian as easily as if it were flint, and manage to produce flakes scarcely thicker than ordinary visiting-cards, nearly as transparent as glass, and having edges of a razor-like sharpness.

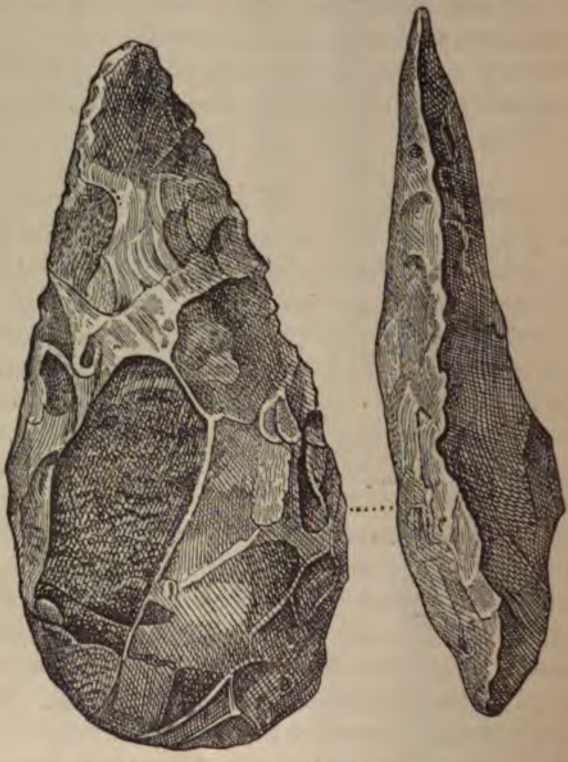
Not only can they do this, but, when they obtain a good-sized piece of obsidian, they do not waste it by making it into flakes, but work it into a spear-head.

So strangely alike are the savage weapons of the present day and those of the long bygone ages, that if in a collection a modern flint knife, a spear, or arrow head were substituted for a corresponding pre-historic specimen, it would require the practised eye of an expert to detect the fraud. Indeed, it was simply by trusting to this permanence of form that "Flint Jack" contrived for several years to sell as genuine pre-historic weapons and implements articles which he had made only a few days previously.

So the flint-spear-head, two views of which are given on the next page, is exactly similar in form and dimensions to the corresponding weapon made by the native Australian. This is an exceptionally fine specimen, and therefore is figured here, but the usual form of spear-head is that which is represented on page 184. The reader will not fail to notice the exact knowledge of the lines of cleavage which must have been possessed by the flint-worker of old, and which enabled him to preserve a sharp edge on each side of the weapon.

Although, for the sake of convenience, the Palæolithic and Neolithic epochs are treated as if they

were perfectly distinct, no distinct line of demarcation can be drawn. Every now and then, a weapon or implement which was beyond doubt the product of a Palæolithic artisan is far in advance of contemporary



Flint Spear-head (1).

work, and makes a near approach to the Neolithic type. Again, it is evident that the Neolithic worker had, like other people, to learn his business by re-

peated trials and failures, and that many examples of his handiwork are so crude that a good Palæolithic workman would be ashamed of such productions.

A very fine example of really artistic work in flint is the spear-head which is represented on page 188. Not only has the worker secured a perfect point and edge, but he has preserved a clear and bold outline through-

Flint Spear-head (2).

Flint Spear-head (2 a).

out,—no small difficulty when working in flint. He has, moreover, given the blade a well-defined shank, which is so perfect that its outline would be creditable to the metal-worker of an epoch which it preceded by unknown centuries.

The last of the spear-heads has lost both its point and its base. Sufficient of the blade, however, remains to show that the point was quite as sharp as

that of the preceding specimen, and that in all probability it had a flat shank without teeth, to serve for its attachment to the shaft.

The distinguishing characteristic of this specimen is, however, that each of its sides is cut at intervals so as to leave a series of sharp projections or teeth not

Flint Spear-head (3).

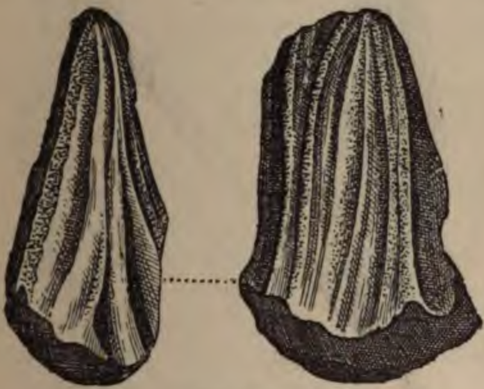
Flint Spear-head (4).

at all unlike those on the edge of the shark's tooth. See the separate teeth on page 151. This could not have been done but for the extreme thinness of the head.

The reader will, doubtless, have noticed the difference of surface in these spear-heads, the two first

specimens being rough, and the marks left by the removal of each successive flake being very distinct, while in the other specimens the surface is comparatively smooth, and shows scarcely any indications of the mode of working. Two views of the tool by which this smoothness is attained are here given, and the reader will at once see how the corrugated surface would rub down the unsightly projections.

In the spear, as well as in the axe, we find that the



Flint-polisher.

metal-workers of the Bronze and Iron epochs copied their predecessors of the Flint and Stone ages, and when we come to the arrow we shall find the same idea carried out on a smaller scale.

Side by side are here placed two metal spear-heads, one of the Bronze and the other of the Iron epoch. The socket, which is clearly an invention of the Bronze age, is employed, in the spear as well as in the axe, as a means for attachment of the head to the shaft.

In the spear also there is a provision against losing the head in case it should fall off the shaft. Instead of the single staple which served as the attachment of the strings which tied the axe-head to the handle, we find a knob on either side of the socket, these

Bronze Spear-head.

Iron Lance-head.

being evidently intended as checks to prevent the cord from slipping off.

In the bronze weapon these knobs are cast on the surface of the socket, but in the iron spear-head they are necessarily forged. Although the pre-historic iron-workers could smelt iron from the ore, their imperfect furnaces could not produce sufficient heat to melt the iron and run it into moulds, so that cast iron is necessarily an invention of comparatively modern times.

There was one advantage in the necessity for forged iron. Castings in a mould are proverbially uniform, and have no individuality, the handiwork of the last being exactly the same as of the first; whereas, when every article has to be separately forged, no two can be alike, and the impress of the maker is stamped upon each of his productions. The iron spear-head was chosen as an example of the playfulness, so to speak, to which hammered iron adapts itself, a masterpiece of which we shall see in a future page.

In this ancient spear-head we can almost trace the thought of the worker as he wrought it. He has retained the general leaf-like shape of the blade, the central rib, the socket, and the double knob. But, in the blade itself, he has let his fancy play upon his work. In the first place, he has given it a wavy outline—flamboyant, as an ecclesiastical architect would say—thus preceding the Malay kris by countless ages. He has also boldly scooped out two semicircular pieces, so as further to lead the eye in the line of the waving curves, and has shown that he possessed the spirit of a true artist.

CONSIDERING the many ages which have elapsed since the pre-historic iron-workers forged their weapons, it is not easy to estimate the quality of their work. But, rude as it may seem to us at the present time, the spear-head or sword-blade of those ancient days may have been of better quality than their appearance would lead us to believe.

For example, our English cutlers consider them-

selves the best in the world. Yet we have seen h the Bornean parangs are superior to our best wo manship, being capable of taking quite as keen edge, and being so tough that, even when use choppers, the edges do not become notched. Japanese, again, have the supremest contemp our sword-blades, and, strange as it may see Zulu warrior of the present day would rightly p the spear-head of his own manufacture to the blade that Sheffield could produce.

Yet his tools are of the simplest kind. A stone serves as the anvil, and a smaller stone, chipped into conical form, as the hammer. bellows are made of goat-skins and the horns ox or eland, as is shown in the accompanying il tion, which represents a Zulu smith at his The art of the smith is among this race q much a mystery as it used to be in the Middl and the smith never exercises his vocation e a distance from the village in which he lives. middle distance, an assistant is breaking up fore smelting it.

The master smith is seen at the double which are blown alternately so as to preser tinuous blast. As the points of the horns w burned if they passed directly into the fire, verge into a clay tube which is not affected

As the bellows have no valves, they ha filled by drawing the air through the horns, a great waste of time. Then, as the poi horns lie loosely in the clay tube, there waste of air, so that the Zulu can scarcel

temperature to a white heat, and his treatment of iron is much limited.

Zulu at his Forge.

with such imperfect means, the native smith
s to make most effective spear-heads. They
usly scooped longitudinally, as may be seen by

the section of the left-hand figure, being convex and concave on alternate sides. They are so tough that they can be rolled up and beaten out flat again without needing to be heated, and they will take so keen an edge that they are used as razors. The genuine Zulu warrior never carries a knife, his assagai blade being sufficient as a weapon of war or hunting, or a knife for domestic purposes.

Kafir. Heads of Assagais.

I have employed the word "assagai" to designate these peculiar spears, but the native name is "umkonto."

The two figures on the right hand represent the throwing assagai. That with the barbed head is fastened to the shaft in a very peculiar manner.

The usual fashion of attaching the head is to bore a hole in the shaft, push the "tang" or shank of the blade into the

[redacted]

hole as far as possible, and then bind it with raw hide, the contractile power of which when drying is so great that it holds as firmly as if it were an iron band. The maker of this spear, however, has determined to produce a highly ornamental weapon, and, instead of binding it with raw hide, has worked over it a part of the skin of a calf's tail, with the hair still upon it. The Zulu has almost a veneration for cows, so that such a binding as this adds greatly to the value of the weapon.

The long-bladed assagai is not intended for throwing.

It was first introduced by Chaka (or T'chaka), the founder of the Zulu kingdom. He got together, and organised by degrees, a large body of desperadoes, who cared little for their own lives, and nothing for the lives of others. He introduced the most rigid discipline, and drilled his forces incessantly, instead of allowing each to fight as he thought best.

When he had brought them into such order that no man would dare to lift a finger without his leave, he introduced a new code of tactics. He caused each man to furnish himself with an oval shield, so large that when its base rested on the ground its upper rim reached to his cheek-bones, so that he could just look over it.

Then, reserving the throwing assagais for hunting purposes, he supplied the warriors with a single assagai, the blade of which was some two feet in length, and the handle not so much. When they went to battle, they rushed on in a stooping attitude, holding their shields over their heads so as to form

[redacted]

a sort of roof, like the "testudo" of the ancient Romans. On no account were they to throw their weapons, but were ordered to rush to close quarters and stab right and left with the long blade.

Chaka was wise enough to understand that the commander ought not to be in the van, and so endanger his life. His brain, and not his hand, was wanted, and so he remained in the rear, with a few of his swiftest men as messengers. Between him and the main body were a company of his most trusted followers, who were his body-guards, and whose duty it was to kill any one who ran away. Flight, therefore, was certain death, and the only hope of coming out of the battle alive was to remain on the field as victor.

Another rule was equally stringent.

As soon as the battle was over, the roll-call was held, and Chaka, attended by his body-guard, inspected his troops personally. Every man had to produce his shield and assagai, and to return without either was, as with the ancient Spartans, a military offence that was punished with instant death.

It is fortunate for us of the present day that Horace was not under Zulu discipline when he ran away, *parmula non bene relicta*, for he would immediately have been put to death, and the world would have been poorer by many an immortal ode.

If a man lost his own weapons in the fight, he might seize either the shield or spear of a foe killed with his own hand; but to appear on the parade without both shield and assagai, either his own or a trophy taken in battle, was a capital offence.

When the introduction of firearms took place, Panda (the brother and third in succession from Chaka, and father of Cetewayo) restored the throwing assagai but retained the stabbing weapon, so that a Zulu's complete bundle of assagais now contains four throwing weapons and one stabbing assagai.

The rapidity, force, and precision with which a Zulu throws the assagai are really wonderful. I have seen one of these men drive five assagais in rapid succession into a circle barely six inches in diameter. He thought it necessary to accompany every throw with a loud yell, and, as the last spear stood quivering in the midst of its predecessors, he strode off with a self-approving grin on his shining countenance. The Zulu can also jerk the assagai underhanded or even backhanded, and whenever he can find cover, and come to close quarters, the assagai is a far better weapon for

Throwing Assagais.

Bechuanan Assagai Head.

him than the newest firearm of European manufacture.

In one form or another, the assagai is in general use throughout Southern Africa. I have therefore selected the Zulu as the best type of the ordinary assagai, and will take the Bechuanan assagai as the best example of variation in the structure and use of the weapon. For all general purposes, the Bechuanas employ an assagai very similar to that of the Zulu. But they also make a special weapon for a special purpose. Their name for it is "koveh," but it is popularly known as the Torture-spear.

As will be seen from the illustration, the head itself is armed with two long and sharlyp-pointed barbs. But these barbs are not considered sufficient for the purposes of the weapon, and accordingly the neck is armed with four rows of barbs pointing in opposite directions. The reader will see at a glance that, when this weapon has penetrated the body, the only mode of extricating it is to cut it out.

The koveh is much too valuable to be used in actual warfare, and is reserved until after the battle. If a prisoner of eminence be taken, his mouth is forced open, and the koveh thrust down his throat. The wound in itself is not mortal; but, if the man chooses to die, it is his own business, according to his captors.

The object for which this terrible spear was made is simply horrible, but no one can fail to admire the admirable workmanship of the weapon, which is far beyond the powers of the best Zulu smith. Indeed, the Bechuanas are far better artificers than the Zulus, and I am inclined to think that much of their superiority is due to their bellows, and the greater heat which they can obtain.

As I have already mentioned, bellows-blowing among the Zulus is a slow and clumsy process, owing to the absence of a valve, so that the air has to be drawn into the bellows through the pipe. Now, a valve, as we understand the word, is quite beyond savage ideas, but the Bechuanan smith employs a very good substitute.

Instead of the skin-bag being quite closed, it has a slit at the top, and on either side of the slit is fastened a piece of wood which acts as a handle, and is attached to the wrist by a loop. When the man draws the skin upwards he opens his hand so as to admit the air, and when he presses it down he closes his hand, thus holding the sides of the slit together.

It is true that these openings cannot be made perfectly air-tight, no matter how closely they are pressed together. Some air does escape, but the loss

is more than compensated for by the quickness of action which allows the Bechuanan artist to obtain a degree of heat unknown to the Zulu smith.

Why the latter should not take a hint from the former is difficult to say, except that human nature is much the same everywhere, and nothing meets with more stolid opposition and active resentment than any attempt to induce the generality of people to forego the ways to which they have been accustomed, and to adopt those which they cannot but feel are better, and whose very superiority arouses their anger.

CHAPTER XIV.

THE SPEAR (CONCLUDED).

Various modes of propelling the Spear—The "Throw-stick of Australia—Its construction and powers—Throw-stick of the Eskimo—The "Ounep" of New Caledonia—The "Amentum" of ancient Rome—The "Blackwall Hitch"—A remarkable sling—Fish-spears—The Australian fishing-spear—Its ingenious structure, and mode of using it—Fishing by torchlight—Fishing by daylight—A strange attitude—The Fishing-spear of Borneo—Its structure, and mode of using it—Poisoning the water—Use of the bamboo shaft.

AS to the shafts of these ancient flint-headed spears, it is probable that, just as the heads are identical with those of the modern Australian spears, the shafts may have been of similar character.

Whether they were propelled in a similar manner is not known; but, considering that the Eskimos, who, as I have mentioned, are in all probability lineal descendants of the pre-historic Cave Dwellers, employ artificial means for increasing the range of their missile harpoons, it is possible that the ancient spears were hurled by means of similar aids.

The length of shaft in an Australian spear is seven feet or even more, while its diameter in the thickest part is not more than that of a man's little finger. The natives can throw it with great force with the hand

alone, but when it has to be thrown to any distance they always use the accessory weapon called the Throw-stick, several varieties of which are here shown.

Although differing from each other in shape as well as in size, all these throw-sticks are constructed on the same principle. The handle is always made so as to insure a firm grasp, and, when the piece of wood from which it is made cannot furnish enough material to supply a good handle, a supplementary knob is fastened to it by "black-boy" wax, as in Figs. 1 to 4, inclusive and Fig. 7.

In most cases the body of the throw-stick is flat, but in others the instrument is merely an elastic rod.

At the top of the instrument a small spike, mostly made of bone, is fastened, as shown in the illustration. As an example of the utter mistrust with which we ought to look at labels upon savage weapons and implements, I may mention that the throw-stick, No. 3, was drawn from a specimen in my collection, and that it bore a label stating it to be an Indian Club! Similarly, the late Dean Alford had in his possession a pair of beautifully-carved foot-rests belonging to Marquesan stilts. They were labelled as "New Zealand Idols," and I had great difficulty in inducing him to believe their real origin.

The mode of using the throw-stick is as follows. It is grasped by the thumb, middle, third, and fourth fingers, leaving the first finger at liberty. The point of the spike is then fitted into a little hole at the but-end of the spear, and the arm is raised over the

Australian Throw-sticks.

shoulder, so that the spear lies horizontally along the throw-stick, and is held in position by the fore finger.

Continual practice enables the native to carry the spear in this position for almost any length of time, just as practice enables a violin-player to hold his instrument horizontally without fatigue, although at first his left arm ached so much that the commands of the inexorable master seemed horribly cruel.

When the spear is thrown, the fore finger is removed, and the throw-stick then becomes a rigid sling, enabling the spearmen to hurl the weapon to an almost incredible distance, and with wonderfully good aim.

Were it not for the throw-stick, the native would seldom be able to obtain the wary and active kangaroo, which is almost as valuable to him as is the seal to the Eskimo. He eats the whole of the flesh and internal parts, uses the bones for a variety of purposes, arms his spears with the sharp claw of the middle toe of the hind foot, and makes thread, string, and cord of the long sinews of the tail.

As to the distance to which the weapon can be hurled by means of the throw-stick, I have seen spears thrown to a distance of eighty yards, and with such good aim, that if a man had been the mark, and he were standing still, more than half of them would have struck him, and none would have missed him by more than a foot or two. When thrown in this manner, the spear makes a peculiar rushing sound, especially as it leaves the stick.

Sometimes the spear is thrown nearly horizontally, and skims over the ground in a series of leaps, very

much resembling those of the flat stone upon the water when boys play at "duck and drake." These under-hand spears are very difficult to avoid, especially when others are hurled in the air at the same time.

On page 201 I mentioned that the Eskimo employs a throw-stick in hurling his harpoon. One of these accessory weapons is given in the accompanying illustration, and is drawn from a specimen in my collection.

Eskimo Throw-stick.

The Eskimo, true to his nature, puts into his throw-stick an amount of careful finish which is entirely absent from its Australian fellow. It is highly polished, and the most remarkable point in it is, that there is a separate groove for each finger, and a hole for the thumb, very much like that of a painter's palette.

In one respect it slightly differs from the Australian implement. The latter is furnished with a sort of barb, the point of which fits into a socket at the butt-end of the spear. The Eskimo weapon holds the spear in exactly opposite fashion, the socket being sunk in the tip of the throw-stick, while the pointed but of the spear is fitted into it when the weapon is used.

The curious object which is shown in the illustration on page 206 has often caused great perplexity to the keepers of museums, who cannot decide upon its use, and generally put it down as a New Zealand life-preserver. In reality, it is a throw-string, performing the same office as the throw-stick,

though it is used in a different manner. It comes from New Caledonia, and is called by the native name of Ounep.

It is made of plaited cocoa-nut fibre, beautifully braided at one end over a ball of some hard material, and woven at the other end into a loop. When the New Caledonian is about to throw his spear, he puts the fore finger of his right hand through the loop, and with a sudden movement twists the knobbed end around the middle of the spear, so as to form a "Blackwall hitch." The peculiarity of this hitch lies in the fact that, as long as a strain is kept upon the cord, it retains its hold, and the greater the tension the firmer is the hold, just as is the case with the ordinary "bowline knot."

Ounep. New Caledonia.

Indeed, the Blackwall hitch is employed to hold the jib, and it is curious to see how one simple turn of a rope will maintain its hold so firmly.

Taking care to keep the cord of the ounep tightly stretched, the dusky warrior hurls the spear just as if he were using a throw-stick. As soon as the strain is loosened, the Blackwall hitch gives way, and allows the spear to fly on its errand, the ounep dangling from the finger all ready for another spear.

To the classical reader the ounep is peculiarly interesting, as he will recognise in it the "amentum" of the ancient Romans, the use of which was such an enigma to the older commentators.

New Caledonians defending their coast.

Ovid, for example, mentions that the warrior inserted his fingers into the amentum, and whirled (*torsit*) the spear. Virgil uses the same verb : "They whirl the amenta" (*amentaque torquent*), while another writer advises the warrior to keep the amentum at full stretch before he hurls the spear. Now, the amentum of the ancients was a long leathern loop, fixed to the middle of the javelin-shaft. It was mostly employed as a means for throwing the javelin with increased force, but was also used by the cavalry as a foot-rest when they mounted their horses.

As to the Blackwall hitch, I may mention that in the time of Captain Cook the Sandwich Islanders employed a sort of sling, which was worked on the same principle. It was a much elongated ounep, and made of the same material. The stones, which were made of hæmatite, and often weighed a pound, were oval in shape, and had a groove running round their long circumference. The cord was laid in the groove, and twisted into the Blackwall hitch, which immediately gave way as soon as the thrower relaxed the tension.

The New Caledonians also use the sling, and so do many other islanders. But the sling is the same everywhere, and no illustrations of it are needed.

We will now cast a glance at some spears which are not used for war, but are employed for the purpose of killing fish and other inhabitants of the water, either fresh or salt.

A primitive but very ingenious fishing-spear is in use in Australia. It is not intended to be thrown, and, as the wielder has to strike his prey at a con-

siderable depth, it is sometimes as much as fifteen feet in length. My own specimen, from which the illustration is drawn, measured between twelve and thirteen feet in length. As the spear often has to sustain at the end a heavy fish, and is, moreover, used as a paddle, the shaft is very much stouter than that of the throwing-spear, and the weapon is altogether a weighty one.

Australian Fishing-spear.

The points of this spear are most ingeniously devised and fixed to the shaft. They are twenty inches in length, and are fastened into grooves in such a way that they diverge considerably from the shaft. Lest, however, they should diverge too much, they are confined by a sort of rope collar, and this collar, the spiral ropes, and the lashing, are all thickly covered with black-boy gum.

Each of these points is furnished with a barb made of bone, and about as large as an ordinary wood

skewer, and then the weapon is considered to be complete.

Generally the natives fish by night, using torches, exactly as is done in Scotland in the sport called "leistering," which is so graphically described in "Red Gauntlet." They can also fish by day, and then have a curious mode of using the spear.

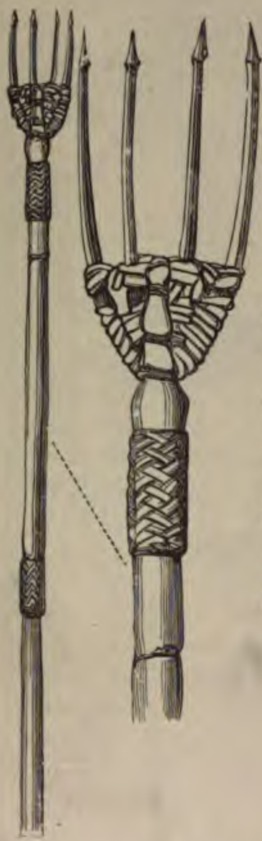
Should there be even a slight wind, the ripple will prevent any one from seeing below the surface. So, instead of standing in his boat, the man lies across it on his face, his legs hanging into the water on one side, and his head submerged within half an inch of the nostrils on the other side. He is thus enabled to see and strike the fish, and then relinquishes to his comrade the task of getting it into the boat.

How the men contrive to preserve their balance in the little shallow bark trough which they consider as a boat is most wonderful. Yet two full-grown men will spend most of the day in one of these canoes without upsetting it. They paddle about, strike the fish, lift them on board, and even cook them on a thick layer of wet sand, and all this in a fragile boat that seems scarcely large enough to accommodate a child of six years old.

The reader will remember that I have alluded to the influence of the country upon the weapons which are made in it. The Australian fishing-spear is made of gum-tree, cord, and bone, all being made secure by black-boy gum. The weapon, however, which is given on page 212, is of Bornean manufacture, and in consequence is made almost wholly of bamboo and split rattan, the four points alone being of iron. The

Fishing canoes on the Murray. (Showing the double use of the spear.)

bamboo being hollow, the shaft is very light, so that if thrown into the water the weapon floats, the head sinking below the surface, and the shaft projecting upwards.



Bornean Fish-spear. (From my Collection.)

Such a weapon is evidently unfit to be used like the Australian spear. In the first place, being only five feet in length, it is too short for that purpose, and, being very light, it could not be driven through the water with sufficient force to pierce the scaly and slippery prey.

I cannot designate the Dyak mode of fish-spearing as "sport," for there is no sport about it. The Australian fisherman has to exercise very great skill and much endurance before he can spear a fish; but the Bornean has no idea of taking any trouble that he can possibly avoid. In point of fact, he is no better than a poacher. He just pounds a stupefying plant and throws it into the river well above the place where he means to station himself with

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his spears. All the fish that come within scope of the poisoned water are stupefied, and float helplessly at the surface. The man then flings his spears at the largest fish as they float by him, and secures them easily by means of the hollow shaft, which acts like a float and always projects from the water.

CHAPTER XV.

THE HARPOON.

Definition of the Harpoon—The oldest known form of the harpoon—Hunting the Hippopotamus—Construction of the harpoon—"Playing" the wounded animal—The Hamran Arab hunter and the hippopotamus—The Eskimo and the Walrus—The Eskimo's harpoon—Its ingenious head and fittings—Use of the float—Harpooning from the canoe, and its dangers—Harpooning from the ice—A clever stratagem—"Playing" the Walrus—The Harpoon-arrow of Vancouver's Island—The Turtle-arrow of Guiana—Its use as a fish-arrow—Its use for killing turtle—Shooting in the Garland—Robin Hood's men—Feathering of the arrows—The Whaler's harpoon.

THESE fish-spears naturally lead us to the HARPOON.

By this word we understand a missile weapon for the capture of inhabitants of the water. It must be made so that when the blow is struck the head becomes detached from the shaft, and is fastened to a float by means of a line. This is rather a lengthy definition, but I do not see how to shorten it.

There is one kind of harpoon which has been in use from time immemorial. This is the weapon which is employed in killing the Hippopotamus. The sculptures on Egyptian buildings inform us that it was used before Moses was born, and Mr. Baines has told

us that the Makoba tribe kill the hippopotamus exactly as did the Egyptian hunters three thousand years ago.

The shaft of this harpoon looks like a piece of scaffolding-pole about ten or twelve feet in length. At one end is a socket, into which is received the shank of a barbed iron point, which is about a foot in length. The point is attached to the shaft by a great number of loose strands, and fits so slightly into the socket that it can be shaken out by a sharp movement. To the but-end of the shaft is fastened a long and very strong rope, which is as carefully coiled in the hunter's canoe as is the "line" in our whaling-boats.

Having prepared their harpoon, the hunters set off in their canoe, and, when they find an opportunity, drive the harpoon into the body of a hippopotamus. They do not much care where they strike, for the weapon cannot inflict a dangerous wound, and its chief object is to hold the animal. On feeling itself struck, the hippopotamus makes a great leap, and tries to escape.

At his convulsive movement, the shaft is shaken from the head, but is still connected with it by the many strands which have been mentioned. Sometimes the animal shows fight at once, but he generally tries to escape, towing the boat behind him as easily as if it were a cork. The object of the hunters is to tire the animal until they can guide it into shallow water, where trees grow on the banks.

When this is done, the hippopotamus turns to bay, and assumes the offensive. He almost always begins

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by trying to bite asunder the cord which holds him. This he could easily do if it were a single rope, but the many loose strands get among his teeth and baffle all his efforts, as shown in the illustration.

Meanwhile, a number of men, who have been running along the banks, plunge into the water while the attention of the animal is distracted, seize the end of the rope, carry it ashore, and pass it several times round the trunk of a large tree. Others rush into the water and fling spears at the animal, which, in vain, turns upon his foes. Each time that he comes nearer to the tree, the shore assistants haul up the rope and secure it afresh,—"haul taut and belay," as sailors would say,—so that he is gradually drawn close to the shore, becoming weaker and weaker from loss of blood. Long-bladed hand-lances are then brought into requisition, and, at last, the huge beast succumbs to his many wounds.

This is the principle on which all harpooning is conducted, the details differing according to circumstances. For example, the Hamran Arabs will attack the hippopotamus single-handed. The shaft of the harpoon is made of bamboo, and is light enough to allow the weapon to be thrown by one hand. There is no "line," but to the iron head of the harpoon is fastened one end of a rope about twenty feet in length, the other end being attached to a large piece of "ambatch," or wood, which is scarcely heavier than cork.

The blow being struck, the bamboo-shaft floats on the surface and is recovered, so that another head and float can be fitted to it. Meanwhile, the wounded

Hippopotamus-hunting.

animal rushes through the water, sometimes making for the land, scrambling ashore and trying to hide himself in a thicket. His position, however, is betrayed by the float, and, if he remains in the water, another harpoon is launched at him, with another float attached to it.

Should he be ashore, and charge his pursuers, they repel him by flinging sand in his eyes. He can endure their spears and continue his attack, but the sand blinds him, and forces him to retreat into the water so as to wash it out.

The result is the same as has already been mentioned, the animal succumbing at last to loss of blood.

Let us now pass from the tropics to the Arctic regions, and see what the harpoon can do for the inhabitants. There, the Walrus is to the Eskimos what the hippopotamus is to the Africans. It is even more valuable, for the African tribes of the Nile district can live without the hippopotamus; though, if it were to be taken away, they would be deprived of all that makes life worth having. But the Eskimo cannot live at all without the walrus.

Its flesh gives them food, its skin gives them their canoes, its intestines give them their waterproof clothes, its bones furnish them with weapons, and its fat supplies them with fuel for their lamp, the only fire that an Eskimo knows, no trees growing in their country, and driftwood being far too precious to be burned.

Within the last few years several flourishing tribes of Eskimos perished by famine, the walrus having

suddenly abandoned their coasts, and migrated to parts unknown.

Necessary as is the animal, its capture is by no means a light task.

A full-grown walrus is as large as an ordinary elephant. Moreover, the animal, being, in fact, a gigantic seal, is at home in the water, and is, moreover, armed with a pair of enormous tusks, which can destroy a native boat at a single stroke. The only device by which the little Eskimos can destroy the walrus is identical in practice with that which is followed by the hippopotamus hunter.

The head of the harpoon is of bone, or the ivory of the narwhal tusk, and is about nine or ten inches in length. The actual point is separate from the head, but is attached to it by a stout leathern thong,

Eskimo Harpoon-head.

as seen in the illustration. In the base of the point there is a small socket, into which the tip of the head fits loosely. The leathern thong is just long enough to hold the point in its place. In this specimen, the maker has armed the point with a sharp-edged plate of iron.

British Columbia Bone Spear-head (Harpoon).

Another, and simpler form of harpoon-head is shown in the second illustration. This kind of weapon, however, is more used by the Vancouver Islanders than by the Eskimos.

One end of a long and tough line is fastened to the head, and the other end is connected with a float made of distended skins. Sometimes the float is attached to the staff, and the staff to the line.

When the Eskimo strikes his prey, the sudden plunge which it makes at the pain of the wound shakes the head out of the socket, leaving the point under the tough skin. The animal always dives, but the float not only impedes its progress, but serves to point out the spot where it will rise.

No sooner does it show itself than the hunter drives a spear into it, and by repetition of this process the animal is so weakened that the hunter can thrust his spear into a vital spot. I need not say

that the greatest courage and address are required in this mode of walrus-hunting, and that none but the most expert and active canoe-men will dare to undertake such a task.

Harpoon.

Another, and more generally-employed, mode is to harpoon the walrus from the ice.

When this is done, several hunters unite together, taking with them their harpoons, to which are affixed

long and exceedingly tough ropes made of hide. Floats are not required. The men paddle to a small sheet of ice, draw their canoes on it, and bore holes in the ice, to which they make fast the ends of the harpoon-ropes. They then guide their ice-raft towards the main sheet of ice, on which the walrus is fond of sleeping, always close to the water.

Even when sleeping, the walrus is exceedingly wary, and, if a canoe were to approach the animals they would at once tumble into the sea and escape. But they have no suspicion of a piece of floating ice, and allow it to drift by them. The hunters have already told themselves off in pairs, and have arranged that each pair shall attack one walrus. When they are abreast of their prey, a signal is given, the hunters spring to their feet, and two or three of the walrus are simultaneously struck. There is some danger to the harpooners, for they carry the line looped over their head in many coils, so that the weight rests on the shoulders.

No sooner has the weapon left his hands than the man snatches the coils of rope off his head and flings them after his weapon. If he should fail to do so at the right moment, the walrus would pull him into the water and drown him, or even tear his head off by the rope. The coils of rope are tied together with a slight string, so that they can be flung off in a single moment. The string is broken by the sudden strain that is thrown upon it by the rush of the wounded animal, so that the coils are set free.

The men allow the walrus to tow the ice-raft about until they are quite tired, hauling at the line as soon

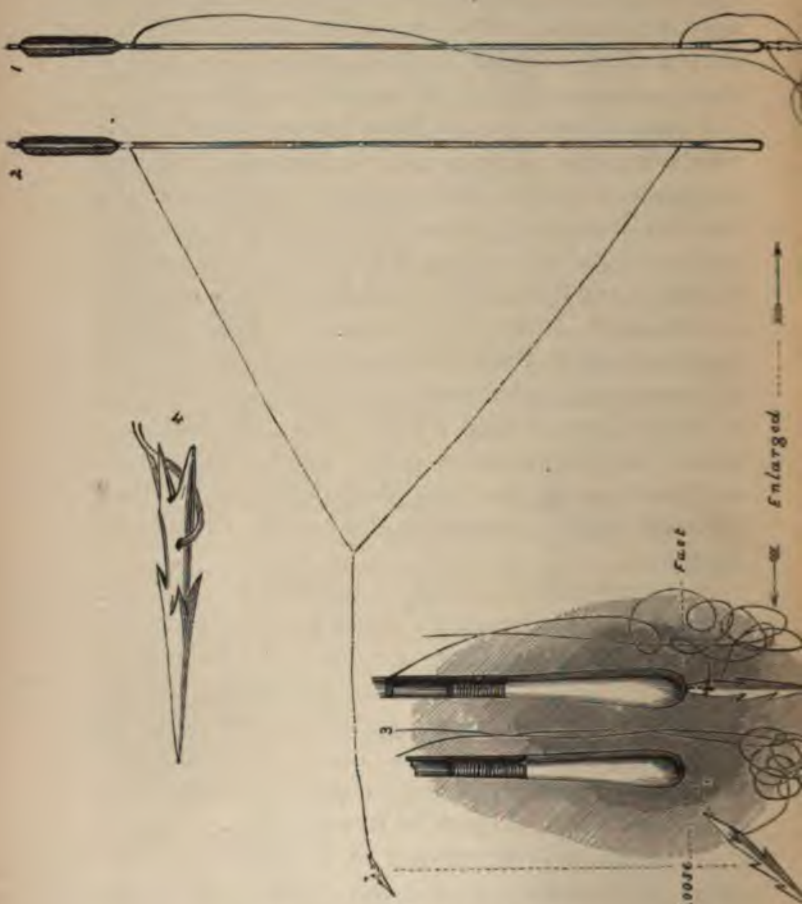
as the animals wish to rest. If they come close to the ice for the purpose of attacking their captors, they are received with lance-points, and at last, when they are too fatigued to resist, the hunters take to their canoes, and finish the animal from the sea.

I was for some time in doubt whether the following weapons ought to be treated as harpoons or arrows. However, although they certainly are arrows, and are shot from a bow instead of being flung by the hand or by the aid of a throw-stick, they are essentially harpoons, and fulfil all the conditions of those weapons.

The shaft of the first weapon is three feet in length, about as thick as a man's finger, and is made of exceedingly light wood. To the end of the shaft is fixed a pear-shaped piece of bone, in which is a socket for the reception of the point. The socket and base of the head are slightly conical, so that, when the head is pressed into the socket, it retains its place.

As in the harpoons, a line is attached to the head. It appears to be single for about two feet, and then divides into a Y-like form, one end being fastened to the head of the shaft just below the feather, and the other to the opposite end, just above the piece of bone. The total length of the line is twelve feet, and it is plaited, not twisted, each strand consisting of a number of fibres laid parallel to each other.

Although the line appears to be single until the point of bifurcation, it is, in fact, double. It is first passed through a hole in the head, and pulled through it as far as the middle. The doubled cord is then lashed together close to the head, and again at



Harpoon-arrow. (From my Collection.)

the angle of the fork. Although the cord is apparently very slight, it is extremely elastic, and of amazing strength.

The harpoon-arrow is intended for the capture of the seal. As soon as it strikes the animal the head is jerked out of the shaft, so that the line assumes the Y-like form, and pulls against the shaft at right angles, thus impeding the progress of the seal through the water. Being very light, the shaft rises above the water as soon as the seal nears the surface. The weight of the bone-tip keeps that end of the shaft downwards, so that the feathered end protrudes first, and serves as a guide to the hunter. As is the case with the walrus, the death-wounds are dealt with the spear, the office of the harpoon being not to kill, but to hold the animal and prevent it from escaping.

This weapon has a considerable range in the northern parts of the world. The specimen which has been described was brought from Vancouver's Island.

Passing from the Polar region to the Tropics, we find a weapon which is constructed on a similar principle. This is the turtle-arrow of Guiana, the point, head, and part of the shaft being represented in the accompanying illustration. The entire length of the arrow is rather more than five feet, and the weapon is composed of three distinct portions.

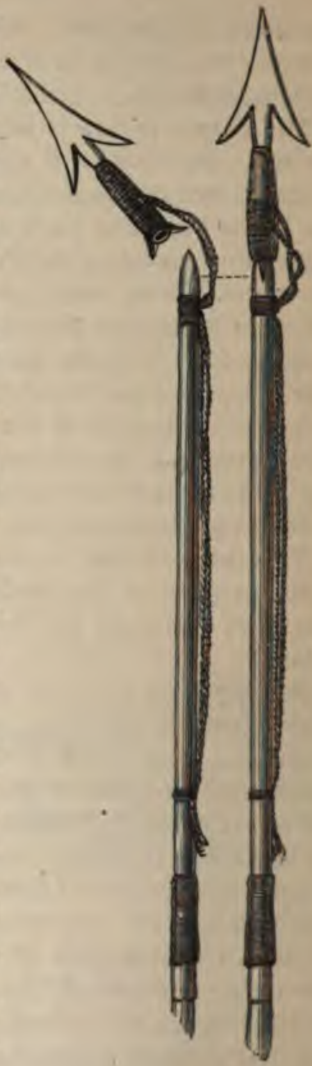
First comes the iron head, which is deeply barbed.

Next, comes a piece of hard wood, mostly made from the "letter-wood" tree (*Brosimum aubletii*), so called because the brown wood is variegated with red marks, much resembling the letters of Oriental

alphabets. This piece of wood is called the "shimara-sherie," or, more simply, the "wire-cash." The long shaft is made of the flower-stalk of the wild cane, and is hollow, like bamboo, and very light.

The feathers of the Guianan arrows are very ingeniously made. They are taken from the corresponding feathers of the right and left wings of the same bird. Their curves, therefore, are in opposite directions, and thus cause the weapon to revolve as it flies through the air.

The mode in which this weapon is used varies according to the creature which is assailed. If it be a fish, the hunter waits until it comes near the surface, and then shoots it. He has previously attached to the wire-cash



Guianan Turtle-arrow. (From my Collection.)

a light line of cotton fibre, the coils of which he holds in his left hand, and can therefore draw the fish to shore as soon as it is struck.

But, when it is used for catching turtle, another plan has to be employed.

The reader may have read of the old English sport of "shooting in the garland." A small hoop, called the garland, was laid on the ground, and the archer had to shoot his arrow to a certain height, and so calculate his shot that, when the arrow came to the ground, it stuck upright inside the garland. It was said of Robin Hood's band that they could stand in a circle round the garland, shoot at a signal, and that every arrow would fall simultaneously into the hoop.

Guianan Arrows.
(From my Collection.)

Though this account may be exaggerated, a somewhat similar feat is performed daily by the Guianan turtle-hunter. To shoot at a turtle as at a fish would be useless, as the weapon would glance off the shell. So he shoots his arrow high in the air, and allows it to fall perpendicularly on the back

of the turtle, which unwillingly acts the part of Robin Hood's garland.

When the turtle dives after receiving the blow, the shaft is shaken off the head, and acts as a float, or "tell-tale," when the reptile nears the surface. A line can then be attached to the cord which fastens the head to the wire-cash, and the turtle can be "played" until wearied, when the spear can be brought into requisition, and the animal killed.

Of the whaler's harpoon of the present day I need say nothing, except that, instead of being a mere instrument for holding the whale while it was killed by spears, it has now been fitted with explosives, and kills the whale at once.

CHAPTER XVI.

THE ARROW AND THE BOW.

Distinctions between the Arrow and the Spear—Origin of the Bow—The "Cloth-yard shaft"—Flint arrow-heads and arrows—Stone arrow-heads—Mode of fastening to the shaft—Bow of the North-American Indian—Its structure and power — Bronze arrow-heads — Bone arrow-heads, plain and barbed—Deer-horn arrow-heads—Power of the pre-historic bow—Ancient harpoon-arrows—British Columbian bow and arrows—Use of sinews—Fish-arrows—Spiral feathering—A patent anticipated—The "Bracer."

TO draw an exact line of demarcation between the spear and the arrow is not a very easy task. The distinction is not due to size, for the arrow of the Guianan Indians is even longer than the assagai of South Africa. It could be thrown by hand or by the throw-stick, and might then be fairly reckoned as a spear, while the assagai could be shot from the Guianan bow, and be ranked as an arrow.

Feathering is no distinction, for many of the Guianan arrows, as well as those of the Friendly Islands, are devoid of feathers, as are the little reed arrows of the Bosjesman. The arrow is, in fact, a small spear projected from a bow, and we must,

therefore, take the bow and arrow as a single, or rather a composite, weapon.

The presence of the arrow is a proof that the bow must have existed at the same time, and, though we may not possess the bow as well as the arrow-heads which it propelled, we may easily find the reason in the comparatively perishable character of the material. The flint, stone, bone, or metal arrow-head defies time, but the shaft of the arrow as well as the bow and its string have perished by decay.

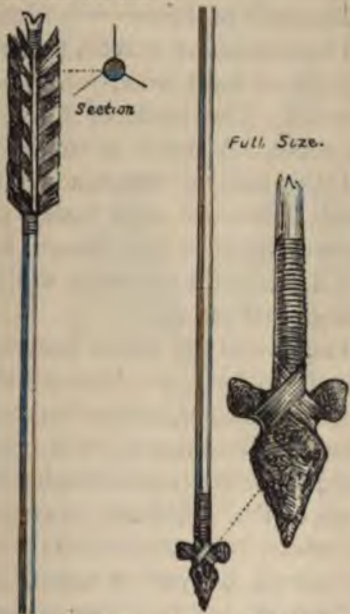
A really ancient bow is a treasure which is seldom found. Most curiosity-shops and museums contain specimens of cross-bows, on account of the lasting nature of the metal from which they were made. But, to find a specimen of the genuine English yew long-bow and cloth-yard arrow, we may search almost every museum in vain, and there are very few, except those who make a special study of the subject, who have ever seen specimens of the weapon which made the English archer the terror of Continental enemies, and gave rise to the well-known aphorism that every English archer carried twenty men's lives (*i.e.*, arrows) in his belt.

The invention of the bow is lost in obscurity, and we have no guide to help us in solving the problem. In the relics of every epoch among which spear-heads are found, arrow-heads are found also. They are made of various materials—flint, obsidian, stone, deer-horn, bone, bronze, and iron. The bow and arrow are at present used in almost every part of the world, and I believe that even among the Zulus of Southern Africa, and the Maories of New

Zealand, the bow and arrow were once in use, but have been abandoned in favour of other weapons.

That the inhabitants of utterly diverse portions of the globe should have borrowed the weapon from each other is not likely. It is impossible, for example, that the inhabitants of Australia could have learned the bow from Africa, or *vice versâ.*

Flint Arrow-head.



Flint-headed Arrow. (Frcm my Collection.)

Carrying out the system on which this work is modelled, I have given here an example of a flint arrow-head belonging to the pre-historic times. As the reader may see, it is almost identical with several forms of spear-head, except in size.

In order to show the mode in which this head

must have been fixed upon its long-perished shaft, I have here given a representation of a flint headed arrow of the present time. This weapon is common among many of the North American tribes, especially among those who, like the Comanches, Blackfeet, &c., have become nations of cavalry, and disdain to fight on foot.

The shaft of the arrow is sometimes made of wood, and sometimes of a reed, furnished at one end with a piece of hard wood into which the flint head is fastened. The mode of fixing the head is always the same. A notch is cut in the end of the shaft, and the base of the head is forced into it. Flattened sinews are then bound over it in the crossed pattern which is here shown, and as the sinew, like raw hide, contracts while drying, it binds the head firmly in its place.

The bow of the North American Indian is so small that it looks more like a boy's plaything than a warrior's weapon, measuring only about thirty inches in length. But these tiny bows possess enormous power, being sometimes made of ash, and sometimes from the horns of the "big-horn" sheep, while a few are made of bone. In any case, the backs are strengthened by successive layers of sinew, fastened on the weapon while fresh, and then allowed gradually to contract.

Neither bow nor arrow is intended for accurate shooting at long ranges, but at short distances the weapon is a terrible one. Many a native hunter will drive his flint-headed arrow completely through the body of a bison, and that with such force that the arrow will fall on the ground on the other side of

the animal. When the Indian bends his bow for such a feat as this, he draws the arrow so far back that the tips of the bow almost touch each other.

The arrow-head which is here shown is made from stone, and was brought from Australia. As the reader may see, its shape enables it to be lashed to the shaft with sinew, like the preceding specimen.

Just as the spear-head of bronze, then of iron, and

Stone Arrow-head, fixed with bitumen. Australia.

Bronze Arrow-heads.

then of steel, imitated in form the primitive spear-head of flint or stone, so we find the metal arrow-head to be in its earlier days an almost exact copy of its predecessors. Indeed, so complete is the resemblance in many cases, that, if the mere outline of each were drawn, it would be almost impossible to distinguish the figure of the metal from that of the stone weapon.

To multiply examples would be a waste of space, and therefore I have contented myself with figures of two arrow-heads made of bronze, and, in conse-

quence, cast in moulds like all other weapons of the same material.

Examples of bone and deer-horn arrow-heads are quite common in good museums, and many of them bear so close a resemblance to the corresponding weapons in actual use at the present day, that it is

Bone Arrow-head.

Many-barbed bone Arrow-head.

not easy to distinguish between the ancient and modern specimens.

The following example, made of bone, is from Australia, but might easily be taken for a pre-historic weapon. It had been fixed to its shaft by black-boy gum, some of which still encircles it.

The next specimen is a pre-historic one, and is remarkable for the close resemblance which it bears to the sting of a wasp viewed through a microscope. The resemblance is, of course, accidental, but it is so close as to be absolutely startling.

Here is a modern Australian arrow-head, which is remarkable as furnishing both the point and barb to

Singly-barbed bone Arrow-head.

a wooden shaft. Curved point-barbs of similar form are sometimes found in tombs, caves, and similar localities, their use being made evident by the savage weapon of the present day. This form of barb is used in making the long four-pointed fishing-spear which has been described on page 209. Until their real object was known, these curved and doubly-pointed pieces of bone were naturally thought to be bodkins or needles.

Here we have a series of ancient arrows made from the horn of the rein-deer.

The first specimen shows the simplest form that can be imagined. It is a plain, flat, leaf-shaped blade, and could have been made by a child. No tool would have been required in its manufacture, as it could easily have been rubbed down on a stone, just as Robinson Crusoe, being without a saw, had to

make a single plank out of a tree-trunk by chopping it down on each side.

The singly-barbed deer-horn arrow-head which is here given has been inserted on account of the eccentric manner in which the maker, after finishing the weapon, has amused himself by carving the base into the head of a fish.

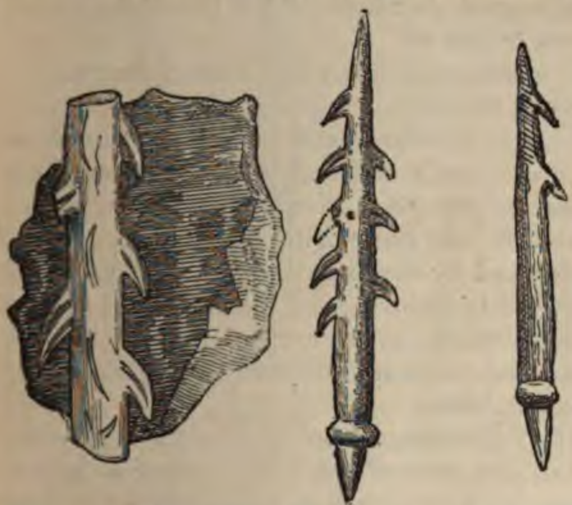
Flat Deer-horn Arrow-head.

Reindeer-horn Barb.

The three specimens which are next shown have evidently been made by the hand of an expert. There can be little doubt that the two specimens which occupy the right of the illustration must have been intended as fish or harpoon arrows, like those which have already been described and figured.

The conical form of the base, together with the projecting shoulder above it, shows that the head

was intended to fit loosely into a socket at the end of the shaft. Now, when we look at weapons which are in use at the present day, we shall find many of them to be keys to the uses of pre-historic weapons. Any one who sees the harpoon-arrows of Vancouver's Island and Guiana must at once understand how the



Barbed Reindeer-horn Arrow-head imbedded in bone. Reindeer Horn. Reindeer-horn Arrow.

hunters of ancient times employed the weapons which survived them for so many ages.

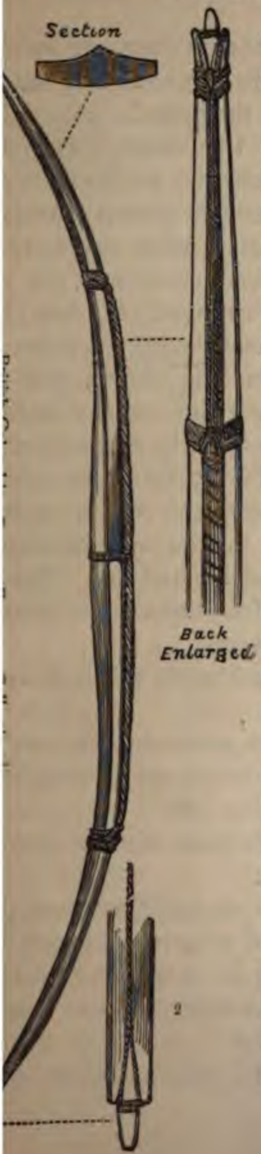
No one would take the trouble of making so elaborate an arrow-head with the deliberate intention of running the risk of losing it when used. He would, therefore, secure the point to the shaft by a cord, and, judging by analogy, a weapon so constructed must have been used as a harpoon.

Not that all many-barbed arrows were intended for this purpose. Some were employed against large game—probably the mammoth itself—as is shown by the left-hand figure, which represents a portion of a many-barbed arrow-head which has imbedded itself so firmly in the bone of the animal against which it was directed, that it could not be withdrawn, and has been broken off.

This remarkable object has another story to tell. Little did the ancient hunter think, when he drew his bow, struck his prey, and lost his precious arrow-head, that it would be found in subsequent ages, and enable those who found it to learn something of him who shot it. Its many barbs tell us that its shape was produced by the experience of many successive generations of hunters, and that, as it is made of deer-horn, which has no lines of cleavage like the flint, it could not have been completed without long and patient labour.

It also tells a story about the bow which propelled it. Although none of the bows themselves have as yet been discovered, and in all probability all must have succumbed to decay, it is very evident that a bow which could drive a deer-horn arrow-head so deeply into a solid bone must have been an extraordinarily strong one.

Had the arrow been furnished with a steel point, a very powerful bow would have been required to produce a similar effect; but, when we remember that the weapon was made of deer-horn, which is certainly not harder than the bone into which it was driven, and probably not so hard, our opinion of the



bow's power is greatly strengthened.

What kind of bow was used by these ancient archers we do not know, and at present have no means of ascertaining. But, judging from analogy, we may safely conjecture that the bow resembled that of the North American Indian; was not intended for long-distance shooting; was small, and was strengthened by sinews upon the back.

I may here mention that the re-curved bows of China and India, which will presently be described, are similarly backed with tendons. A remarkable example of the use of sinews in increasing the power of the bow is afforded by a weapon which is in use among the Aht tribes of British Columbia. The maker of this weapon has applied [illegible] in a most e[illegible] effective m[illegible]

fifty double cords of sinew pass from one end of the bow to the other, and are drawn so tightly that, even when the bow is unstrung, they can be with difficulty raised from any part of the wood. The plaited loop, by which they are fastened to the ends of the bow, is beautifully made, and is shown separately in the illustration. The sinews have evidently been prepared with the greatest care, and are nearly translucent. They are arranged in four layers, each layer being placed exactly over its predecessor.

Not content with these long sinews, the maker has still further strengthened the bow by adding six more layers, of half the length, in the centre. The intricate and ingenious plaiting by which these additional sinews are fastened to the bow must be seen to be rightly appreciated, but an approximate idea may be obtained from the illustration. The entire length of this bow is four feet three inches, and it is made of a single piece of wood.

Three of the arrows belonging to this bow are here given.

In all of these arrows the points are made of bone, and are barbed. Two of them are double-pointed, and are intended for shooting fish.

The most remarkable portion of these arrows is the feathering.

The real object of feathers is not, as many people fancy, to make the head of the arrow lighter, but to impart a spiral motion to it as it flies through the air, and thus, as in the rifle-bullet, to keep it straight in its course.

Some twenty years ago I saw a description and

figures of a newly-patented arrow. In order to make the spiral movement more rapid, the inventor put on the feathers spirally. The arrows were certainly very steady, especially against a head wind, and they never "wobbled" with decreasing speed. I wrote to the inventor, telling him that his invention, clever as it was, had long been anticipated by the semi-savages of Vancouver's Island, and inviting him to call at my house and inspect the weapons. This he did, and found to his surprise that the feathering of the Aht weapons was exactly like his own. He brought with him several of his arrows, and also a series of rifled bullets and shells, on which deep spiral grooves had been made, so that they would revolve by the action of the air, even if fired from a smooth-barrelled gun.

British Columbian Arrows. (From my Collection.)

Our modern archers, who only draw the bow for their own amusement, possess among their equipments a sort of gauntlet called a "bracer." It is made of stiff

and polished leather, and is buckled on the wrist for the purpose of protecting it from the recoil of the string.

This is generally thought to be a modern luxury, tending to a careless handling of the bow, a really accomplished archer being supposed to grasp his bow in such a manner that the string clears the wrist.

But there is "nothing new under the sun," and, just as the Aht had anticipated the inventor of the spiral feather, so has the Eskimo worn the bracer from time immemorial. His bracer is even more effective than ours, being made of three flat plates of walrus ivory highly polished. Such a bracer could never be worn out, and might be handed down from father to son for many successive centuries.

CHAPTER XVII.

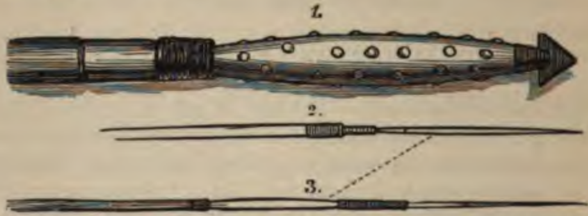
POISONED ARROWS—REVERSED BOWS.

Detachable Arrow-heads — The use of poison — Arrows of the Bosjesman—Reversible arrow-heads and their uses—Iron barbs and clumsy mode of making them—The two kinds of poison—Snake-poison, and mode of obtaining it—Irritating the snake—Taking the poison and eating the body—The poison-grub and its properties—Mode of carrying the arrows—The quiver and the circlet—Dangerous neighbours—A gallant defence—Poisoned arrows of Guiana—Wourali poison—The "Hog-arrow"—Poison-wood and its use for arrows—Origin of poisoned arrows—Reversible bows—Their structure, use, and power—"Cupid's Bow"—Metal bows.

IN all the previous spears and arrows which have detachable heads, the shaft and head have been connected with a cord, so as to prevent the latter from being lost. But there are arrows in which the head is altogether separable from the shaft, and which would lose most of their efficacy if the shaft were not detached as soon as the blow was struck.

Such arrows, as a rule, have their tips poisoned. When the animal is struck, it naturally starts or jumps, and so shakes off the shaft, leaving the arrow-head in the wound. Otherwise the wounded animal might seize the shaft in its mouth, and tear the weapon out of its body. If a monkey were struck

in a non-fatal spot, it would certainly pull the arrow out with its hands. But, as the shaft falls off, the head itself affords no hold for teeth or fingers, and while the animal is trying to pull it out the poison is doing its work.



Arrow-heads. 1. Barbed Arrow-head, full size. 2. Unbarbed ditto, reversed in shaft. 3. Ditto, with poisoned point outwards. (From my Collection.)

The best-known of these arrows are those of the Bosjesman of South Africa, some of which are represented in the two following illustrations. There are two modes of poisoning the tip, but the general form of the arrow is the same in all cases.

The shaft is about a foot or thirteen inches in length, and is simply a hollow reed, strengthened at each end by being wrapped with sinew or intestine-fibre. Then comes a piece of bone, usually that of the ostrich, the object of which, like the "wire-cash" of the Guianan arrow, is to give weight to the lower end of the weapon. Over the bone is slipped a small cylinder of reed, wrapped with intestine-fibres to strengthen it, and acting as a socket for the reception of the point.

This important part of the weapon is spindle-shaped, being scraped to a point at each end, so that

either end can be inserted into the reed tube. Mostly the point is nothing but the sharpened end of the tip; but in many specimens, particularly if the tip should have been broken off, a rude iron head is inserted. This is always of a triangular form, and is beaten out of any iron scraps, and then rubbed into shape upon a stone.

The Bosjesman has no idea of forging iron and therefore has to undergo much needless labour Though he generally has a knife hung round his neck, and an assagai in his hand, he has not learned from his neighbours how to make either, and therefore purchases them for skins and ostrich feathers, he being a most accomplished ostrich-hunter.

As I have already mentioned, he obtains his poison from two sources. The usual arrow-poison is made from the poison secreted by the puff-adder or cobra, the former being preferred, mixed with the juice of the euphobia. His mode of taking the poison from these formidable reptiles is rather startling.

Trusting to the reptilian temperament of the snake, which causes it to lie immovable until disturbed, he walks very gently to the animal, and deliberately sets his bare foot on its neck. In its struggles to escape and natural attempts to bite its assailant, the poison-gland becomes strongly excited, and secretes a large amount of the venom. This is just what the Bosjesman wants, and he then kills the snake, eats the body, and saves the poison for his arrows.

Snake-poison is put very thickly on the arrow-point, and serves as cement wherewith the triangular

Bosjesman Quiver and Arrows.
(From my Collection.)

iron barb is fastened in its groove. Even if the wounded animal should succeed in tearing out the head, the iron barb remains in the wound, carrying with it a deadly amount of poison.

If the reader will look at the arrow-head (Fig. 4), just by the quiver he will see a little barb protruding on one side. This is a pointed piece of quill, the base of which is laid on the arrow-head, and the poison plastered round it, holding it tightly as it dries. This barb also, not being fastened to the arrow-head, is sure to remain in the wound, together with the iron barb, and also to retain poison with it.

The arrow, of which three views are given in the previous illustration, is conspicuous for the round knobs with which it is studded. These little knobs are drops of poison from the N'gwa—sometimes spelled K'aa—of Southern Africa. The word in question is not reducible to the rules of orthography, owing to the three clicks, *i.e.*, the lingual, guttural, and palatal, with which many of the South African dialects are studded, and which are popularly designated as "click, clack, and cluck." A comma after a letter, as N'gwa, N'gami, G'nu, signifies a click.

The grub in question is the larva, apparently, of some beetle, and feeds on the leaves of a species of thorn. The grub is about three quarters of an inch, when fully grown, and is of a pale flesh colour. The whole of the interior of this grub is a terrible poison when introduced into a wound, and seems to kill by causing acute mania.

When a Bosjesman uses it, he breaks it asunder, and studs one half of the bone-tip with little drops of the juice, not spreading the poison over it, as is done with the snake-poison. Before he touches the grub, he examines his hands and fingers minutely, and, if he finds the least scratch, he postpones the operation.

Whatever may be the poison, only one end of the bone-tip is imbued with it, and the poisoned end is always kept downwards in the shaft until it is wanted. This is for the sake of safety, and I wish that we took half as much care about loaded guns and pistols as these savages do about their poisoned weapons.

When the arrow is wanted for use, the tip is reversed, so that the poisoned end projects ready for service. In case of war, the Bosjesman fastens round his head a sort of leathern circlet, into which he thrusts the end of the shaft, so that the arrows radiate round his head, with the points outwards, and can be snatched in a moment when wanted.

The bow is a very insignificant affair, seldom much exceeding two feet in length when strung. Any stick seems to answer as a bow, provided that it will bend. It is not held perpendicularly, but horizontally, so that no very accurate aim can be taken. This, however, is of little consequence, as the range is very short, thirty yards being quite a long shot for a Bosjesman.

Insignificant as the tiny Bosjesman may seem, an adult man not being taller than an English boy of eight years old, he is as terrible a foe as the reptiles from which he obtains the poison for his arrows. No snake can creep more silently or stealthily than a Bosjesman, nor can it conceal itself more effectually when occasion arises. He is looked upon as scarcely a higher being than a puff-adder, and many people think that to shoot a Bosjesman, no matter what he may be doing, is to confer a benefit on mankind.

Even the Kafirs, with their reckless courage, and though able to cover their whole body and limbs behind their great war-shields, do not like to attack the Bosjesman. Sometimes they are obliged to do so in defence of their property, the Bosjesman being an arrant cattle-thief. Now, to meddle with a Kafir's cow is to touch him on his tenderest spot, and ac-

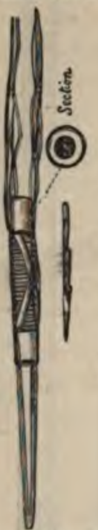
cordingly a well-armed party will start off in chase of the thieves.

On one such occasion, the Kafirs brought the Bosjesmans, some six or seven in number, to bay against some rocks, and with their assagais, which have a range superior to that of the Bosjesman's arrow, killed them all except one. The undaunted little savage had no idea of surrender. Lying behind a stone large enough to shelter his tiny body, he drew towards himself with his bow the arrows belonging to his dead comrades, and defied his enemies. A sudden rush, though only by two men, would have overwhelmed him, but would have involved certain death to both. They could only stand at the longest range of their assagais and shower their weapons on him, while he replied with his poisoned arrows, laying many of his enemies dead on the field, and not succumbing until his last arrow was expended.

Guianan Hog-arrow and sheath.

SOME remarkable examples of poisoned arrow-heads, which are intended to be detached from the shaft, and are of no value if they

be lost, are to be found in the "Hog-arrows" of Guiana. These weapons are intended to be used against the largest animals of tropical America, such as the "hog," *i.e.*, the peccary, the jaguar, the tapir, and the howler-monkey. As the shaft of the hog-arrow is almost exactly the same as that of the turtle-arrow, I need only mention the head.



Quiver for Arrow-heads.

The socket in the "wire-cash" is square, or, rather, oblong, and the head fits loosely into it. In order to hold the head in its place before it strikes its mark, a slight strip of bamboo acts as a spring. This spring may be seen in the two left-hand figures.

The head itself is nothing but a strip of flat coucourite wood, rudely cut into barbs, and about three inches in length. Owing to the small size of this head, thirty or forty can be carried in a little cylindrical quiver, made of bamboo, while a couple of shafts will be sufficient for a day's successful hunting.

The barbed head is dipped in the celebrated wourali poison, the effect of which is, first, to paralyse the voluntary muscles, and then those of respiration, so that, as soon as it mixes with the blood, the wounded animal is unable to move, and then dies by gradual congestion of the blood. The great length of the shaft enables the arrow to pursue a straight course through the boughs, aquatic herbage, or brushwood, by which a shorter weapon would be deflected.

The operation of the poisoned head is much the same as that of the Bosjesman's arrow, except that an animal which has been wounded by the Bosjesman can run for some distance before it falls, while a creature which is poisoned with wourali can only run or fly for a few yards, and then moves no more.

The Guiana Indian takes quite as many precautions with his weapons as does the Bosjesman. He always keeps the poisoned heads in the little quiver until he is actually on the hunting-path, and even then he places a bamboo cover over it, as seen in the illustration, never removing it until he is about to fit the arrow to the bow.

The name of the poison varies "according to the taste and fancy of the speller," as Mr. S. Weller said, and appears as oorara, curara, woorara, and other fancy spellings.

The accompanying illustration represents a number of arrows with heads so large that they look as if they ought to belong to spears. These heads are all made of wood, and some of them are gouge-shaped, being cut from a species of bamboo. Those on the left were given to me by the late Charles Waterton, who told me that they were said to be "poison-wood," but could give no more information about them.

He was perfectly right as to their poisonous properties, and Mr. C. B. Brown gives the following account of them:—

"We arrived at a smooth, open river beyond the Rappu Rapids.

"The islands in these rapids and a river near by

Guianan Arrow-heads.
(From my Collection.)

Guianan Arrow-hea
(From Mr. Christy's Col

are so called from the existence of a peculiar species of tall and graceful bamboo which flourishes there, not being found further north. Pieces of the stem of this bamboo, dried and used by the Indians as arrow-heads, are said to possess similar properties to the far-famed wourali poison. They split up the stem, dry the pieces over the fire, and then shape them into lance-heads, which they fasten on the ends of arrows.

"Wild animals wounded by these arrows are at once completely paralysed, and in that condition easily despatched. This bamboo is tall, growing singly and not in clumps, from a mass of matted roots, like the common bamboo."

There can, I think, be little doubt that man borrowed the idea of poisoned weapons from the stings of insects and the teeth of venomous serpents. Almost in every land where bows and arrows are weapons in constant use, poisoned arrows are employed both for war and hunting. The reader will remember that the Bosjesman actually transfers the poison of the puff-adder and cobra to his arrows.

HAVING seen the bow in its simplest form, *i.e.*, the rude and feeble weapon of the Bosjesman, we will take two examples of the Bow when carried to its highest stage of perfection. A singularly beautiful specimen of the perfected bow is here represented, the drawing having been made from a specimen in my collection.

As a mere specimen of Indian art, it is highly

finished—so highly, indeed, that a close inspection is required before its excellences can be seen. From one end to the other, the bow is covered with vivid green and bright scarlet as a background, and upon this ground are drawn an endless variety of tiny leaves, arabesques, and flowers, all traced in shining gold.

Indian Bow.

The brilliancy of these colours is intensified by a coating of varnish, which is quite colourless, and yet is so tough in quality that it does not crack or fly, even under the exceptional amount of bending to which such a weapon is liable. The bow is extremely strong, and yet wonderfully elastic, and I was naturally anxious to ascertain its mode of construction.

Of course, I would not demolish so beautiful a weapon, but was fortunate enough to obtain a bow of similar structure, which had been so battered and

broken that I had no hesitation in pulling it to pieces —no easy task, so strongly was it made.

The actual bow—*i.e.*, the elastic portion—is made of a long horn, probably that of the arnêê, an Indian buffalo, whose horns are sometimes three feet in length. The horn has been sawn asunder longitudinally, and has then been flattened and brought to the proper curve. This was probably done by the aid of steam.

To each end were then fastened firmly, partly by lashing with wet sinews, and partly by a very strong glue, a piece of hard wood, which was destined to receive the cord, and to act as the tips of the bow. The basal ends of the horn were fastened in a similar fashion to a wooden handle, and the whole weapon was then trimmed and scraped, until it presented the form shown in the illustration.

At this stage of progress the bow was very elastic, but not sufficiently strong ; so several layers of fresh sinew were then worked into the back, just as has been narrated of the American Indian's bow. Over these sinews successive coats of fine glue were laid, each being rubbed down as it dried, so that a smooth surface was obtained for the reception of the colour and varnish.

A glance at this weapon shows that, before it can be strung, it must be completely reversed. I often tried to string it, but never could succeed. Indeed, I have only known one man who could perform this feat, and, although it looked easy enough, I never could manage it.

He stepped into it with his right foot, if I may use

the expression, and drew it up so that the lower curve came under the same knee, and the back of the handle rested against the other leg, just above the knee. Then he gave it a sudden thrust, so as to bend it back over his left knee, and with the same movement slipped the loop of the string into its notch. It was scarcely the work of a second, and, indeed, could not be done slowly.

The same officer, General Hutchinson, R.E., also showed me the use of the curved swords which have already been described on page 145.

When strung, the bow is entirely altered in shape, and is exactly like the "Cupid's Bow" of classical sculpture. That bow was evidently no mere invention of an artist, but an actually existing weapon. In "Athenæus" there is a well-known passage, where a shepherd defines the archaic Greek letter **C** (*i.e.*, S), as like a Scythian bow.

Three objects are attained by this recurved form. In the first place, the strength of the weapon is enormously increased; in the second place, it occupies very little space; and, in the third, it can be carried on the bridle-arm of a horseman, and strung in a moment, when wanted for use.

The second illustration shows the bow and all its accessories.

When new, this outfit must have been most imposing, the quiver and bow-case being covered with crimson velvet, so heavily embroidered with gold that in some places the velvet can scarcely be seen. The bow is also very handsome, being covered with gold patterns on a scarlet ground, but it does not exhibit

the minutely-finished art which distinguishes the first-mentioned weapon.

Sometimes these bows are made of steel. Metal bows are of very ancient date. See, for example, 2 Sam. xxii. 35: "He teacheth my hands to war, so that mine arms do bend a bow of brass." (Revised Ed.) Also see Job xx. 24: "He shall flee from the iron weapon, And the bow of brass shall strike him through."


Indian Bow, Quiver, Belt, and Bow-case.

Another bow, which must not be altogether passed over, is the wonderful weapon of a wonderful race, namely, the bow of the Andaman Islanders.

The size and shape of the weapon are alike markable. If we can imagine a flattened hour-gl

six feet in height, we shall obtain a very good id
of this bow.

A powerful Englishman can hardly draw this bo
more than a few inches, and yet the Mincopie,
these people are called, draw a "cloth-yard shaft
with perfect ease, though the tallest men amon
them scarcely exceed five feet in height. I ha
tried to draw one of these bows myself, and cou
no more do so than the weakest of Penelope's suito
could bend the bow of Ulysses.

CHAPTER XVIII.

THE CROSS-BOW.

General idea of the Cross-bow—The Fan tribes and their cross-bow—The Poisoned Arrow—Clumsy mechanism—Gumming the arrows—The trigger and the cord—A Norman cross-bowman—The Bow-stirrup and its use—The Genoese cross-bow—The Winch, and winding up the bow—"A shaft or a bolt"—The Stone-bow—Indian Pellet-bow—Repeating cross-bow of China—An ingenious contrivance—The slide, the lever, and the peg—Structure of the arrows—Effectiveness of the weapon.

WE now find a new element introduced into the bow, the weapon being set cross-wise on a stock, and the string released by means of a trigger.

The most primitive form of the CROSS-BOW is that which is found among the Fans, a cannibal tribe inhabiting the district east of the Gaboon and near the Equator. Their rightful name is Ba-Fank.

They are a brave, ferocious, and withal kindly set of people, much given to hospitality, and troubling themselves little about clothes; in fact, their character has been summed up by describing them as a race of naked cannibal gentlemen.

It is positively startling to find, among such a race, an invention like the cross-bow. Yet, there it is, and must have existed for a very long time. It is


Fan Cross-bow.

impossible that they could have borrowed the idea of the weapon from other sources. They have only been known to Europeans within late years, and the cross-bow was in use when they were discovered.

The weapon is a remarkable mixture of effectiveness and weakness. The object of the weapon is to discharge the tiny arrows which are represented in the illustration on page 261. They are so small that they could not be discharged from an ordinary bow, and so the cross-bow was devised. The arrows scarcely deserve the name, and, if exhibited separately from the bow, few persons would believe that they really were arrows, and very terrible weapons.

To all appearance, they are simply strips of wood about a foot in

length, and not more than the sixth of an inch in width. They have no feathers, and no special point. There is not even any provision for weighting the point, so that it shall fly straight instead of swerving in its passage through the air, or being at the mercy of the slightest breeze. Indeed, it is so exceedingly light that it would probably be blown off the cross-bow while its owner is taking aim, and it has to be stuck in its place with gum.

Fan Quiver and Arrows.

Being of this character, it is evident that the arrows must owe their efficiency to poison, and this is really the case. The poison is of a vegetable nature, but at present its precise origin is unknown. Neither is any antidote known even to the Fans themselves.

It is evident that a mere narrow strip of wood cannot fly to any great distance, neither can it be directed with precision, and it is really wonderful that, after inventing the cross-bow, the Fan should not have improved the arrow so as to enable the warrior to obtain a much greater range and more precision of aim.

Then, the contrivance for discharging the bow is so strangely clumsy that it is impossible to loose the string without disarranging the aim. Moreover,

the whole business of dressing the bow, fixing the arrow, taking aim, and discharging the weapon occupies as much time as was occupied by loading and firing the matchlock arquebus of the Middle Ages.

In drawing the bow, the Fan archer has to sit on the ground, and put his feet against the bow, one foot on either side of the stock. Then, he draws the string with both hands, and lodges it in a notch cut across the stock.

Next, he has to dab a little gum on the necessarily shallow groove of the stock, and then to lay an arrow in it and press it on the gum. Then he has to get up, take what aim he can with the long stock projecting over his shoulder, and at last he discharges the weapon.

The mode in which this is done is ingenious enough, and a very little more ingenuity would have doubled the power of the weapon.

The reader will see that the stock is split longitudinally, up to the spot where it suddenly increases in thickness, and that the upper and lower portions are kept apart by a transverse peg. This peg is the trigger; but its use could not be even conjectured even by seeing the weapon at a little distance, much less by inspecting the figure.

The reader can, however, see that just beyond the trigger there is a slight pattern cut on the stock, and that it stops abruptly at a dark bar. This bar marks the notch into which the string is drawn. In the middle of the notch a hole is bored completely through the upper division of the stock, while into the lower portion is fixed a round wooden peg that

passes through the hole and projects beyond it for about the third of an inch.

When the archer prepares to draw the bow, he pushes the trigger between the two halves of the stock, so as to separate them from each other. This action pulls the peg downwards out of the hole, and leaves room for the string to be lodged in the notch. When the man wishes to discharge the weapon, he pulls out the trigger, and allows the two halves to meet. The peg attached to the lower half is thus pushed upwards through the hole, and forces the string off the notch.

This combination of movements is highly ingenious, but wholly needless. Instead of splitting the stock, the maker need only have bored the hole completely through it. The lower end of the peg would then have projected below the stock, and could have been forced upwards by a lever.

Norman Cross-bowman.

Now, let us contrast the cross-bow of civilisation with that of the savage.

The accompanying illustration shows the cross-bowman of the time of the Norman Conquest. Except for the shortness of the stock, which enabled the weapon to be aimed from the shoulder, there is not very much advance on the Fan weapon.

ne reader will, however, notice that the head [illegible] of
stock, beyond the bar, is furnished with a sort [illegible] of
rup. This was for the reception of the fo[illegible]t
ile the string was drawn, so that the archer cou[illegible]d
aw his bow without being obliged to sit dow[illegible]n.
It seems astonishi[illegible]g
that so simple an a[illegible]d-
dition to the weap[illegible]n
should never have o[illegible]c-
curred to so clever [illegible] a
race as the Fans.

Genoese Cross-bowman.

Before long, steel w[illegible] as
substituted for wood [illegible] as
the material for the bo[illegible]w,
several plates being la[illegible]id
on each other, like th[illegible]se
of our carriage-spring[illegible]s.
The strength of t[illegible]he
bow was, therefore, [illegible]so
much increased that [illegible] it
could not be drawn by
the unaided arm, and,
accordingly, mechanical
means were employed.
In the earlier weapons,
a lever and ratchet were
used, but the lever soon gave way to the winch. In
small weapons, such, especially, as were used for sporting purposes, the winch was permanently attached
to the stock; but in the large weapons, which were
used in battle, the winch was a separate piece of apparatus, and was only applied to the bow when in use.

The illustration depicts one of the Genoese cross-bowmen who fought at the battle of Crecy, and shows him in the act of winding-up his bow. This process took up some little time, and the cross-bowman was no match for the English archer, who had no preparations to make, and who could snatch from his belt an arrow, and discharge it with deadly aim, while the Genoese was getting his foot into the stirrup of his bow.

The arrow which was proper to the cross-bow was a very short one, and was called a "bolt" or a "quarrel." Hence the saying, "I will make a shaft or a bolt of it," *i.e.*, if the piece of wood were not long enough for a cloth-yard arrow, or shaft, it would still serve for a bolt.

There was a variety of this weapon which was called the "Stone-bow," because it threw stones or bullets instead of arrows. It was made in two ways. In one, the bullet was enclosed in a little leather pocket, which was closed when the string was drawn tight, and opened when it was loosed from the catch. In the other, an ordinary cross-bow was convertible into a stone-bow by fitting to the stock a barrel with a long slit in it, through which the string was passed.

This weapon was used for sporting purposes. "Oh for a stone-bow to hit him in the eye!" exclaims Sir Toby, when Malvolio is giving himself airs. As, however, it killed silently, the possessor of a stone-bow, unless he were a gentleman and qualified sportsman, was looked upon with suspicion as a probable poacher. I have no doubt that Shakespeare in his

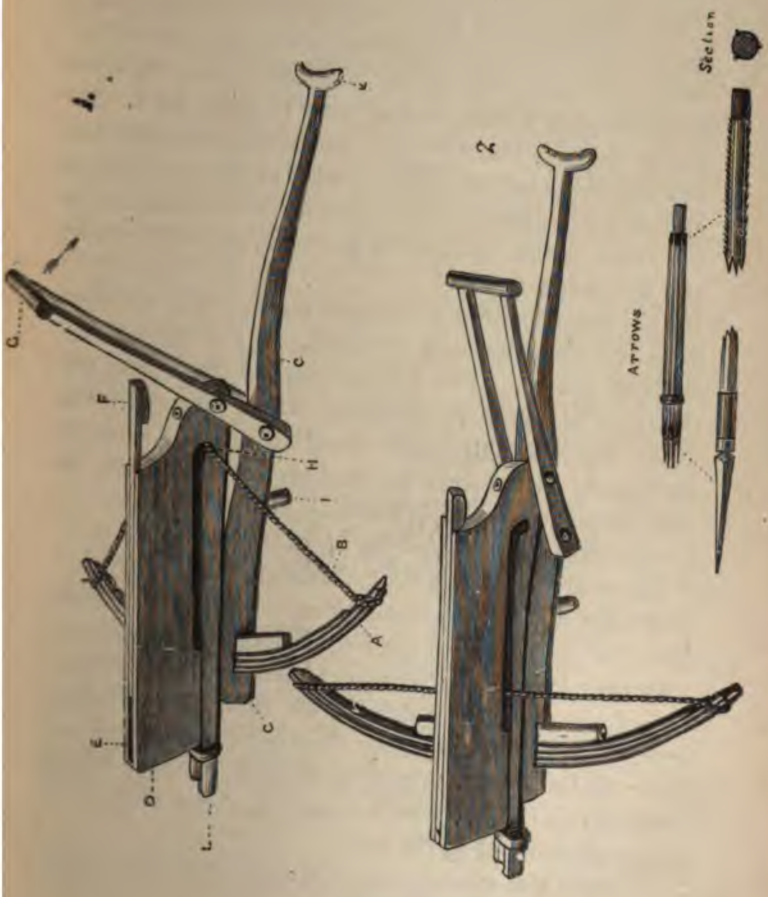
younger days made use of the stone-bow in his raids upon the deer.

In connexion with this branch of the subject, I may casually mention the pellet-bow of India, though it is not a cross-bow. It has two strings, which are kept apart by a couple of pieces of wood some two inches in length, one near each end of the bow, so as to leave the strings parallel to each other. A piece of soft leather is fastened from string to string in the centre, where the arrow would be placed in an ordinary bow. The missile, mostly a clay pellet, made in a bullet-mould and baked hard, is held in the leather between the finger and thumb, and then shot as if it were an arrow.

Sòme little address is required in handling this bow so as to send the missile clear of the left hand. A novice generally knocks the skin off his left thumb or fore finger more than once before he learns the right way of holding the weapon.

THE last variety of cross-bow which I shall mention is one of present historical interest, inasmuch as it is one against which we have often had to contend in China. The specimen from which the illustration was drawn formed part of the defenees of the Peiho fort, and was captured when that stronghold was at last taken. On account of the extreme ingenuity displayed in its structure, it deserves a detailed description.

The bow itself is made of the male bamboo, and is in fact three bows fastened together, just like the



Repeating Cross-bow. (From my Collection.)

plates of the steel cross-bow; and, if this were all, the weapon would be like any other cross-bow, and require no description.

The peculiarity of this weapon, however, is, that it has a repeating action of the most ingenious character, and, as long as the magazine can be kept supplied with arrows, so long will it continue to discharge them. The man who works this machine has nothing to do but to push forwards the lever, C, and pull it back again. This simple action discharges the arrow, places another in position, draws the bow, and discharges it.

This remarkable bow is much too heavy to be used from the shoulder, and is intended as a defence for fortified places. The reader will see that beneath the stock is the pivot which fits into a socket on the wall. So, while the right hand works the lever, C, backwards and forwards, discharging an arrow at each movement, the left hand is placed on the cross-handle, at K, and directs the flight of the arrows.

These arrows are almost identical with the "bolts" that have already been mentioned. As may be seen from the lower part of the illustration, they are armed with very long and heavy steel heads, while the other end of the shaft is furnished with three feathers that reach about half-way to the steel head. The vanes of these feathers are clipped until they are only about the eighth of an inch in length. See the section of the feathered end of the bolt.

Now we will examine the mechanism by which the repeating action is obtained.

The first figure represents the weapon as it appears

when the bow is drawn nearly to its full extent, just before the string is released.

The key to the mechanism lies in the magazine, or slide, marked D. It is a very narrow box, open above and below, the upper opening being closed at will by a sliding top, F. It is just wide enough to allow an arrow to be dropped into it, and will hold eight or ten arrows, one above the other. Through the magazine is a slit, through which the string passes, as in the stone-bow, and at the end of the slit is the notch, or catch in which the string is held.

This magazine slides backwards and forwards, being jointed to the lever, G. It is now evident that, if the slide be pushed forward by the lever, the string will fall into the notch, H, and that, when the lever is drawn back, it will pull the slide with it, thus drawing the bow.

But, how is the string to be released? This is done by an arrangement almost identical with that of the Fan cross-bow. Through the middle of the notch, and exactly under the centre of the string, a round hole is bored, and in the hole is placed a wooden peg. Being rather smaller than the hole, the peg can play freely up and down.

When the lever is moved forwards, as in Fig. 1, it lifts the slide, and so the peg drops down, and allows the cord to be placed in the notch. But when the lever is brought back, as in Fig. 2, the slide comes down upon the stock. The peg is then driven upwards through the hole, and the cord is knocked off the notch.

With this weapon a man and a boy can do great

execution, the man directing and discharging the bow, and the boy keeping the slide filled with arrows. As the reader will easily understand, as soon as an arrow is discharged, the one above it drops into its place.

CHAPTER XIX.

THE BLOW-GUN.

The Boy's Pea-shooter—Tom Brown—A siege in college——Raising of the siege—The Blow-gun, or Sumpitan, of Borneo—Structure of the weapon—The bayonet anticipated—Decoration of the sumpitan—A peculiar arrow—The bamboo quiver—The Upas-tree—Upas poison and mode of carrying it—English sailors and the Sumpitan—A Water Dyak—Head-hunting—The Pucuna of Guiana—Its composite structure—Back sight and fore sight—The Arrow—Staining and rolling the arrows—Effect of the wourali poison—Fate of a hunter—Range of the weapon—A winged arrow—Waterton's description of the wourali—The Cotton-basket—The quiver, silk-grass, and scraper—The Pirai—Remarkable use of its teeth.

IT may fairly be assumed that all my readers who belong to the male sex are, or have been, practically acquainted with the "pea-shooter," and are aware of its capabilities as an instrument of annoyance. See, for example, Tom Brown's journey homewards on the London coach. The pea-shooting period of life, however, soon passes away, and it is seldom that an adult makes use of the instrument.

Once, however, several years after I had left school, I had to avail myself of its powers, not for annoyance, but in self-defence. Among Oxford undergraduates there has existed from time immemorial a playful custom of making raids upon a man's rooms

at night, pulling him out of bed, treating him to a cold bath, and "making hay" of his furniture and property.

Being aware of this custom, when I went into residence I chose a garret set of rooms, only approachable by a narrow spiral staircase, which is faithfully represented in "Verdant Green," *cujus pars parva fui.*

Owing to the difficulty of storming such a fortress, I had been left in peace for nearly three years, but one day received private information that an attack would be made that night. Being in the habit of making chemical experiments, I had several glass tubes in the room, and there was no difficulty in purchasing and conveying secretly into college a large supply of the heaviest and roundest peas that could be procured.

The attack began by a volley of stones at the windows. But the assailants received so many peas in their faces that they had to protect themselves with their caps. This left the tops of their heads and their ears exposed, and, as I could see them by the "quad" lamps, and they could not see me in the dark rooms, nor tell from which window to guard themselves, they were soon driven under shelter. Then they tried the staircase, but with even worse success, and at last called a truce.

Such an instrument is well enough by way of a toy or such a combat as has been briefly narrated, but that it should become a terrible weapon of war is hardly to be expected. Yet there are two parts of the world where the Blow-gun, which is little more

than a magnified pea-shooter, is as much to be dreaded as the rifle.

The missiles which it projects are necessarily of the slightest description, their efficacy being due to the poison with which their points are armed. These weapons are the Sumpitan of Borneo, and the Pucuna, or Zarabatana, of Guiana.

Bornean, with Sumpitan.

Being the better known weapon of the two, the sumpitan will be first described. The word is pronounced as soompit'ahn, the accent being laid on the last syllable.

In order to give a general idea of the weapon, a figure of a Bornean warrior is here given. His only weapon is the sumpitan, which he holds in his right

hand, while at his left side is hung the little quiver which contains his store of poisoned arrows.

The sumpitan is about eight feet in length and an inch in diameter, its bore, which is wonderfully smooth and true, being about half an inch across. Such a tube would be a perfectly effective weapon,

Head. Bornean Sumpitans. Butt and Tip.

but the Bornean takes a great pride in his weapon, and often displays much taste in ornamenting it. The decoration is confined to the two ends, the middle being left quite plain.

He always binds each end with metal, so as to prevent it from splitting, and generally arms the tip with a spear-blade, which acts like a perpetually-fixed bayonet. This spear-head is firmly bound to the shaft with copper or brass wire. In the weapon which is represented on the right hand of the illustration, the shaft is made of a dark and highly-polished wood, while the but-end is defended by a brass cap, so deeply corrugated with circular rings that it looks at first as if a small brass rod had been coiled round the weapon.

The left-hand sumpitan is made of a lighter-coloured wood, ornamented at each end with an elaborately-inlaid pattern of white metal. The last few inches of this sumpitan are composed entirely of metal, the weight of which serves to balance the weapon when held to the lips.

Quiver and Arrow.

The arrows which are propelled through the sumpitan are quite as remarkable as the tube itself. One of these arrows, together with an enlarged view of its base, is here shown, while on the right is seen

the peculiar quiver in which they are kept. A Bornean of either sex thinks it necessary to have the waist girded with as many copper or brass girdles as can be afforded, and into them the man can thrust the forked projection, as seen in the portrait.

The shaft of the arrow is no thicker than a lady's steel knitting-needle, is made of the thorn of the sago palm, and is only six or seven inches in length. In order to make it fit the bore, it is furnished at the base with a conical piece of pith, as seen in the illustration.

Such a missile is in itself harmless, but the sharp point is imbued with the celebrated upas poison, concerning which so many absurd legends have been narrated.

The tree, for example, was said to grow in the depths of a dark and gloomy valley, and to poison the very air around it, so that birds which attempted to fly across the valley fell into it and died. The poison was said to be obtained by means of condemned criminals, who were offered their lives if they could bring back a flask filled with the juice of the tree. Most of them were said to perish, so that the tree was surrounded with human skeletons, but those who were strong enough to escape gained their lives and a heavy reward besides.

In reality, poisonous though the juice may be when it mixes directly with the blood, the tree is harmless enough, and even the powers of the juice have been greatly exaggerated. When freshly applied to the arrow, a wound causes certain, though not instanta-

neous, death, but an exposure of a few hours to the air robs it of its potency.

The warrior, therefore, never poisons his arrows until he wants them, and for this purpose he carries with him a little flask of upas juice, so that he can renew the poison when needed. The flask is made of the ever-useful bamboo. The natural joint of the bamboo forms the bottom of the flask, while the mouth is closed with a large lump of wax, so that the air is effectually excluded.


Poison Flask.

As is the case with the little poisoned arrows of the Fans, much of the efficacy depends on their small size, which renders them practically invisible, so that they cannot be avoided, and a man may be struck without hearing a sound or seeing a movement which would betray the position of the enemy who aimed the arrow.

Some years ago, when our sailors were ignorant of the sumpitan and its powers, many of them fell victims to the poisoned arrow.

The rivers and their mouths swarmed with pirates (since put down by the late Sir J. Brooke). Seeing the fighting-decks of the war-canoes swarming with men bearing the sumpitan, the sailors thought they were only armed with spears, and allowed them to come within range without suspecting the character of the weapon.

One of these bloodthirsty pirates is represented in the illustration as he appears when setting out on a "head-hunting" expedition. Rajah Brooke did much to abrogate this custom, but it is almost impossible to eradicate the tone of thought and ancient customs of a people, and even now head-hunting is carried on, but clandestinely and not openly. The warrior who is represented in the sketch evidently thinks that he is about to perform a most praiseworthy task and deserves credit for undertaking it.

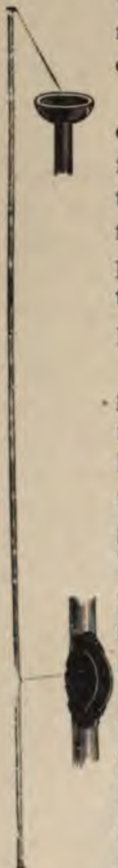
He is armed with the large tufted shield which is peculiar to the country, and will be described in its place. He carries the sumpitan wherewith to kill his enemy, and the parang in order to cut off the coveted head. In order to show his pride in his task, he has adorned his head with a feathery diadem, and hung enormous brass rings in his ears. Some of these Dyaks will have a row of holes bored all round the edge of each ear, with a ring in every hole, and will even hang several rings on each other chainwise, until they reach the breast.

It is no wonder that they should be so keen in head-hunting, for no one is held in the least consideration until he can show a head. No woman will look with eyes of favour upon one who has not proved himself a man by taking a head, and no man will speak to him as an equal. Superstition adds to the bloodthirsty proclivities of the Dyaks, for they believe that, when a man dies, he cannot rest in his grave unless his relatives procure a fresh head to lay upon it.

Rajah Brooke soon found that it was impossible to

Sea-Dyak Warrior with Sumpitan, Parang, and Shield.

make the people believe that head-hunting could be morally wrong, and he therefore contented himself with checking it as much as possible. The mode which he adopted was simple and efficacious.



The Pucuna.

When he found out that a head-hunting expedition had started, he sent a superior force after them, disarmed them, and took them prisoners. After trial they were fined heavily. If they had succeeded in procuring any heads, the trophies were taken away and double fines were imposed.

The fines were never retained, but were given as presents to those chiefs who had not allowed their followers to go head-hunting. Thus the chiefs became detective officers upon each other, and gradually abandoned the horrible custom. The North American scalp-hunting is repulsive enough, but not nearly so offensive as the exhibition of the entire head as a trophy.

THE sumpitan is a wonderful weapon, but the pucuna, or blow-gun of the Macoushis of Guiana, is still more remarkable. The word is pronounced as pookóonah.

In the first place, it is much longer, and, in the next place, it is of a more complicated construction.

The actual tube through which the arrows are blown is formed from a very peculiar reed (*Arundinaria Schomburghii*), popularly called by the name of "ourah." Waterton, to whom we owe the first description of the pucuna, did not know its history, though his description of it is perfect. In his "Wanderings" he writes as follows:—

"This extraordinary tube of death is, perhaps, one of the greatest natural curiosities of Guiana. It is not found in the country of the Macoushi. Those Indians tell you that it grows to the south-west of them, in the wilds which extend betwixt them and the Rio Negro.

"The reed must grow to an amazing length, as the part the Indians use is from ten to eleven feet long, and no tapering can be perceived in it, one end being as thick as the other. It is of a bright yellow colour, perfectly smooth both inside and out. It grows hollow, nor is there the least appearance of a knot or joint throughout the whole extent."

The ourah is a very local plant, and appears only to grow on the sandstone ridges of the Upper Orinoco. The first joint of this reed is sometimes sixteen feet in length, and is, as nearly as possible, half an inch in diameter.

As the walls of this reed are very thin, it would soon be broken were it not protected by an outer covering, and, indeed, it plays the part of the thin steel tube which lines the coiled gun. The strengthening-case is found in a small palm (*Iriartea setigera*), popularly called "samourah." The palm, when cut

down, is soaked for some time, and then the softened pith is pushed out with a long rod.

The ourah is introduced into the samourah, and fixed with wax. This is a very delicate operation, as the two tubes must be accurately centred.

Even yet, the weapon is far from complete.

In the first place, the two ends must be protected from splitting. The upper end is protected by half of an acuero (or aquiro) nut (*Astrocaryon aculeatum*). This nut is spherical, black as ebony, and nearly as hard. When the nut is cut asunder, a hole is bored through one half of it, so as to make it fit tightly on the end of the pucuna, where it is fixed with kurumanni wax (see the illustration). Of this material I shall presently treat.

The hard nut answers a double purpose. It effectually preserves the end of the tube from splitting, and acts as a fore-sight when the man takes aim.

A back-sight is also wanted. This is obtained by taking two incisor teeth of the acouri (a rodent allied to the guinea-pig), and fixing them with kurumanni wax on the shaft, as shown in the illustration.

The blow-gun being now complete, we have to consider the arrows, which, in principle, resemble those of the sumpitan.

These arrows are made from the leaf-stem of the coucourite palm, and are about nine inches long, one end being scraped to a needle-like point. In order to make them fit the blow-gun, the short yellow fibre of the wild cotton-tree is wrapped round their base, and tied very artistically with fibres of silk-grass. Putting on this padding is a work of some

difficulty, for if it be too large the breath cannot force it through the tube, while if it be too small its power is lessened, and if it be not perfectly regular it will not fly straight.

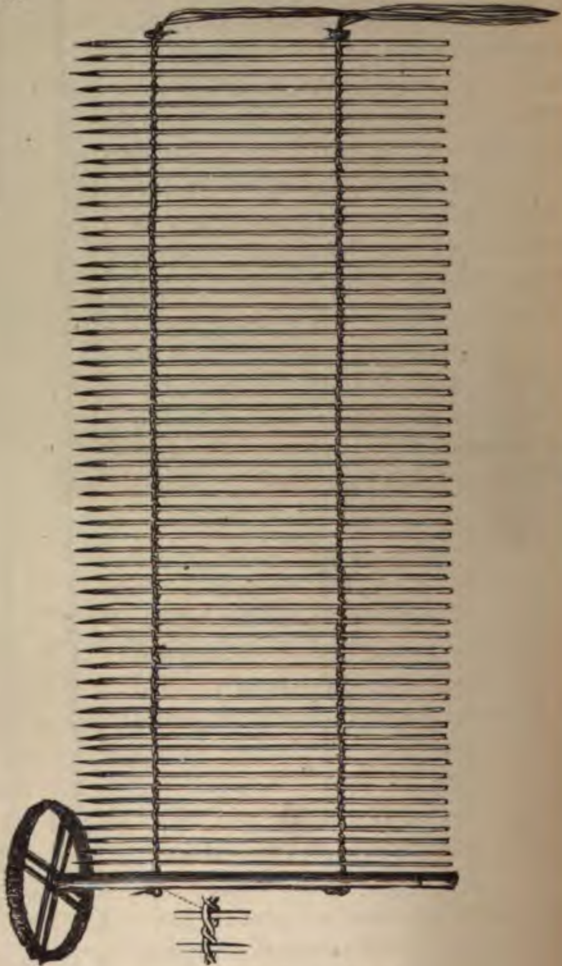
When a man goes out to hunt, he only carries a few of these prepared arrows with him, but he has a stock of a hundred, or even more, which he carries in a very ingenious manner. He first makes a little wheel of split reed, and fastens it to a stick, as shown in the figure on next page. Then he bores two holes through the stick, and passes through each of them a double string made of cotton-fibre. Between these strings he lays the arrows, twisting the strings above each arrow, as shown.

For the sake of saving space, only a few arrows are represented, and the strings are shortened. But the hunter generally has a hundred or so fastened in a row, and, when he has completed the stringing, he rolls them up round the stick and ties the string round them, as in the second illustration.

I may mention that a sort of a knotted slide is worked over the strings, so that it can be pushed forwards when the requisite number of arrows have been strung, and slid back when others are added. The knotted slides can

Guianan Blow-gun Arrows.

be seen in the figure, just above the uppermo
arrow.



Blow-gun Arrows Strung.

The object of arranging the arrows in this manner is twofold.

As I have already mentioned, the points of the arrows are as sharp as needles, and, as the coucourite wood, though very hard, is extremely brittle, the points, on the sharpness of which so much depends, might be broken if they were allowed to rattle loosely in the quiver.

By this plan of tying the arrows, the points are protected, while any arrow can be drawn from the roll without disturbing the others.

A still more important object is to guard the hand

Blow-gun Arrows rolled round the Stick.

of the owner against an accidental prick from one of the arrows. They are imbued with the terrible wourali poison, so that a man might be killed with his own weapon. This did once happen to an Arowack hunter. He had shot a hog-arrow at a howler-monkey, and had missed it. In its descent the weapon glanced off a branch, and struck the man through the arm. He knew his fate. "I shall never," said he to his friend, in a faltering voice, "bend this bow again." And, having said that, he took off his little bamboo poison-box (see page 250) which hung across his shoulder, and putting it, together with his bow

and arrows on the ground, he laid himself down close by them, bade his companion farewell, and never spoke more."—Waterton's "Wanderings" (Macmillan & Co.), p. 144.

The force with which the arrow is propelled is really wonderful, and the weapon is practically invisible, the needle-like shaft being too small to be seen at all, and the yellow cotton-fibre at the but-end being scarcely more visible. Being desirous of testing the power of the pucuna, I fitted one or two of the unpoisoned arrows with white cotton-wool, and, taking with me a sharp-eyed friend, an artillery officer, I tried the weapon on Lessness Heath.

Although the cotton cone was not made of the right material, and was fitted by an inexperienced hand, I could send the arrow well over a hundred yards. A Macoushi Indian would, I have no doubt, propel an arrow very much farther, for the cotton-wool would be of the right kind and properly fitted, and the man would know the proper management of the breath.

Another kind of blow-gun is used by some of the tribes, and is called by the name of zarabatana. It is shorter, thicker, and heavier than the pucuna, and is made in a different manner. There is no ourah, or inner tube, but a small palm is split longitudinally, the inside removed, and the two halves are then lashed together by spiral wrappings of ittiritti reed.

It is always furnished with a wide mouthpiece, made of hard wood.

One of these weapons in my possession was seven feet long, and weighed three and a half pounds. The pucuna which was given me by Waterton was

eleven feet in length, and only weighed a pound and a half.

With the zarabatana a different kind of arrow is used. It is much heavier than that of the pucuna, and of a more complicated structure. It is furnished with an iron head, and, instead of a padding of cotton-wool, it has the base fitted with a conically-twisted piece of very thin bark, something like the "bass-matting" which is used by gardeners in tying up flowers.

It is, besides, furnished with a sort of feathering made of the same material, and curled in opposite directions, so as to insure a spiral movement when the weapon passes through the air.

The wourali poison, which renders these weapons so deadly, is made chiefly from the wourali vine (*Strychnos toxifera*). Other ingredients are mixed with it, especially the hyarri, a species of *Lonchocarpus*, which, like the cocculus indicus in this country, is used for poisoning the water and bringing the stupefied fish to the surface. It appears to have the same effect when passed over the gills that the wourali has when mixed with the blood, paralysing their action, and so asphyxiating the fish.

It is said that the poison of certain

Winged Arrow.

snakes, and the bodies of certain venomous ants, are mixed with it. But I gave some of the wourali, which was brought from Guiana by Waterton, to Dr. Herman Beigel, the well-known German toxicologist, for analysis. He made many careful investigations, and pronounced definitely that there was no mixture of animal matter in the poison. He also analysed for me the snake and grub poison of the Bosjesmen, and the upas poison of Borneo.

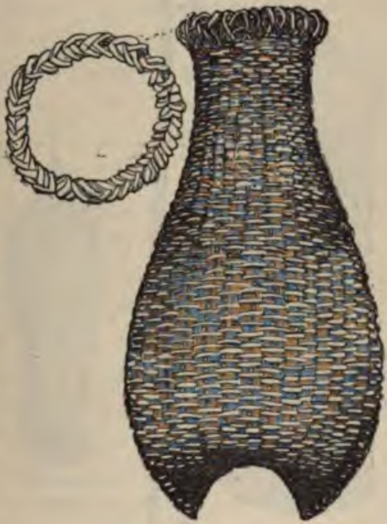
Many experiments have been made with the wourali poison, and with varying results. The fact is, that almost every tribe in Guiana makes its own poison. That which is made by the Macoushis is by far the strongest, and is so highly valued by other tribes that a little earthen vessel of it, hardly larger than an ordinary apricot, will purchase a canoe large enough to hold a dozen men.

Besides, the poison loses its strength unless very carefully preserved, and is greatly injured by moisture. The natives keep it in little globular vessels covered with hide that is put on when raw, and carefully kneaded and rubbed until it fits nearly air-tight. In the rainy season the poison-vessel is always hung near the fire, and the owner frequently examines it to make sure that it is perfectly dry. So even the very best wourali would fail in producing its full effect, if similar precautions had not been taken. Waterton was so cautious in this respect that, whenever he left home, he always carried the wourali with him; and, in consequence of these precautions, all experiments made upon the poison obtained from him were successful.

When fresh, it looks something like treacle, and

has a peculiar and somewhat pungent and aromatic odour. Its taste is intensely bitter, not unlike that of quassia, and possesses the same aromatic flavour which is perceptible in the odour. When spread upon the arrow-head, it dries with great rapidity, and soon turns quite black.

The full accoutrements accompanying the pucuna are two in number, namely, the cotton-basket and the quiver.



Cotton-basket.

The former is a flask-shaped basket made of ittiritti reed (*Maranta obliqua*), as shown in the illustration. No cover is required, though it is always carried with its mouth downwards, by a strap attached to one of the mitre-like points. It holds an astonishing amount of cotton, and indeed, when a full basket is emptied and the contents allowed to expand, the operator looks as if he were performing a conjuring trick.

The cotton is taken from the seeds of the silk-cotton tree (*Bombax ceiba*), a huge tree with extra-

ordinary buttress-like projections standing out from its stem, and looking very much as if a number of huge irregular boards had been set up with their edges against it.

The fibre is so short that at present it can only be used for stuffing mattresses and pillows. But, if any machine should be invented which could deal with these fibres, the cotton-tree would be nearly as valuable as the cotton-shrub.

Quiver and Sharpener.

Now comes one of the most important accessories to the pucuna. This is the quiver which is represented in the illustration.

The dice-box-shaped body of the quiver is a closely-woven basket-work made of the ever-useful ittiritti reed, and the bottom is formed of a thick, stout, circular piece of wood. The whole of the quiver is thick-coated with kurumanni wax, so as to render it

[redacted]

impervious to water. This wax, by the way, is to the Guianan what the black-boy wax is to the Australians, and by the eye alone it is impossible to distinguish one from the other.

The cover is worthy of notice. It is always made of the skin of some animal—my own specimen was the skin of the capybara,—and, when wet, is worked with the hairy side downwards, over a wooden block, a little smaller than the top of the quiver. When quite dry, it is nearly as hard as horn, and very elastic, so that, when placed over the top of the equally elastic quiver, it can be pressed over it. A sort of screwing movement is employed together with the pressure, and the effect is that the cover is perfectly water-tight, and guards the poison against the injurious effects of damp.

Attached to the quiver may be seen a coil of thread and a piece of bone to which some teeth adhere. The thread coil is made of the Silk-grass Aloe (*Agave vivipara*). The long leaves of this plant are supported by parallel fibres, which are extracted in a very simple manner. The leaves are steeped in water until the soft parts decay, and they are then drawn repeatedly through a loop of cord until all the soft parts are removed and nothing is left but the fibres.

These are of amazing strength in spite of their fineness, and are extensively employed by the natives. The object of having them attached to the quiver is, that they shall be at hand when the hunter wants to fit some more arrows for the pucuna, and bind the cotton on them with the peculiar "cross gartering" employed for this purpose.

skeletons of frogs, mice, birds, may be made by sinking tl tadpoles swarm. Acting on a lake dwellers of Warai dispos lowering them into the water. everything from the bones, whicl hung up in nets.

Mr. C. B. Brown mentions follows :—

"The pirai were so abundant a times it was dangerous, when ba water to a greater depth than Even then, small bodies of thes would swim in and make a da legs, and then retreat to a sh actually bit the steering paddles through the water astern of tl which I shot swimming across nose eaten off by them whilst w the shore."

[redacted]

the pirai as sharpeners for his arrows. Their edges, like those of the shark, cut like razors, and the arrows are sharpened by being laid at right angles between two teeth and then drawn backwards with a slight pressure, taking off an extremely fine shaving at each movement.

CHAPTER XX.

THE SHIELD.

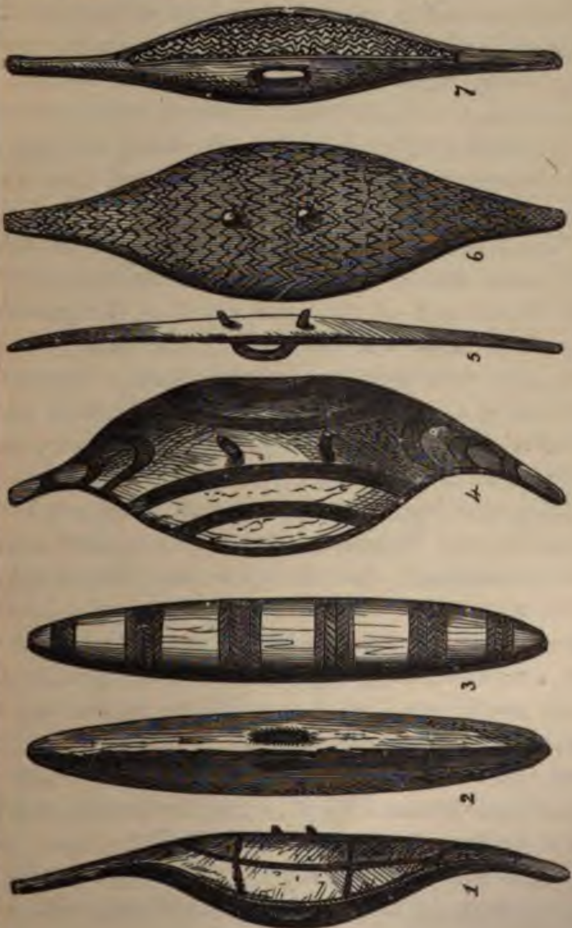
Early use of the Shield—Wooden shields—Australian shields and their distinctive character—Different modes of making the handle—The shield and the boomerang—A broken boomerang—Central African stick-shield—A built shield—The Dyak shield and its ornaments—The Zulu shield and its manufacture—Chaka and his code of military law—"Washing" spears—Regimental uniform—Handle of the shield—The shield used as an offensive weapon—Cavalry horses and Zulus—A circular Kafir shield.

HAVING now cast a hasty glance at weapons of an offensive character, we will trace the development of Defensive Armour.

The first portion of defensive armour is naturally the shield, which assumes various shapes and dimensions, according to the material and the weapon to which it is opposed.

Just as we have looked to the Australian savage for the primitive form of the club and spear, so we look to him for the primitive shield. The object differs exceedingly in shape and size, but it always retains a character which is peculiar to itself, and by means of which it can be recognised. So, although all these shields are widely different from each other, no one who has even a slight knowledge of ethnology could mistake the country whence they were brought.

n Australia, all shields go by the generic name of leman, but each variety has its own specific name, h as Tamaxang, Mulabakka, &c. &c.



Australian Shields.

Two modes of making the handle prevail in these shields.

One consists of boring two holes completely through it, and passing the end of a flexible stick through the holes, so as to leave a loop on the inside. This mode of making the handle may be seen in Figs. 1, 4, 5, 6. The other mode, as may be seen in the remaining figures, consists in cutting through the solid wood, so as to leave a rounded bar which answers as a handle.

Figs. 2 and 3 represent this latter kind of shield. It is rather heavy, weighing more than three pounds, and is cut out of the solid wood of the gum-tree. Fig. 7 represents a shield made on the same principle, but of a still more remarkable form. Instead of presenting a tolerably wide surface in front, it comes to an edge, so that at first sight it seems very badly adapted for the purpose.

It is, however, exactly the very weapon which is required, and its special object is to guard against the boomerang. For the spear the "black fellow" cares very little. As soon as it leaves the hand of the adversary, the native knows exactly where it will fall, and, if it be going to strike him, quietly steps aside and allows it to pass. But the boomerang is a very different weapon, its flight being so erratic that even the keen and experienced eye of the native is sometimes deceived by it. (See the boomerang and spear ordeal mentioned on page 91.)

The safest plan is to meet the boomerang boldly—"play forward," as a cricketer would say,—and let it dash itself against the shield. A heavy shield is,

therefore, necessary; but weight alone is not sufficient. When caught on the shield, the boomerang is nearly sure to break, and in that case the broken portions converge with such force that one of them has been known to cut a man completely open and lay him dead on the spot, shield still in hand.

It is needful, therefore, that the man who receives the boomerang should be able to divert the broken pieces from his body, and this is done by giving the shield a sharp twist as it meets the boomerang. The least touch will guide the pieces of the missile clear of the body, and thus the shield insures the safety of its owner.

A shield of a precisely similar character is used in some parts of Central Africa. It is little more than a stout stick, about as thick as a mop-handle. It is used as a defence against the spear, being held in the middle, and twisted with such rapidity that it either breaks the spear or flings it to a distance. Specimens of this odd kind of shield are not uncommon in museums, where they are mostly labelled as unfinished bows.

Now and then the Australian does make a shield that is large enough to shelter the body, and which will permit even the boomerang to be smashed against it without needing any skill on the part of the holder. In such a solid block of wood it was, of course, impossible to make a handle in the usual fashion, and so the native artist has scooped two deep oval holes parallel to each other, and has then "undercut" the wood from one hole to another, so as to form the handle.

Sinking these holes by the usual process was evidently a task which the maker did not like, and he

Australian Shield.

therefore made use of fire, burning them as deeply as he could, and then scraping out the charred portions. The undercutting, however, could not have been

achieved by fire, and must have been a very tedious task with such imperfect implements as were within the reach of the maker.

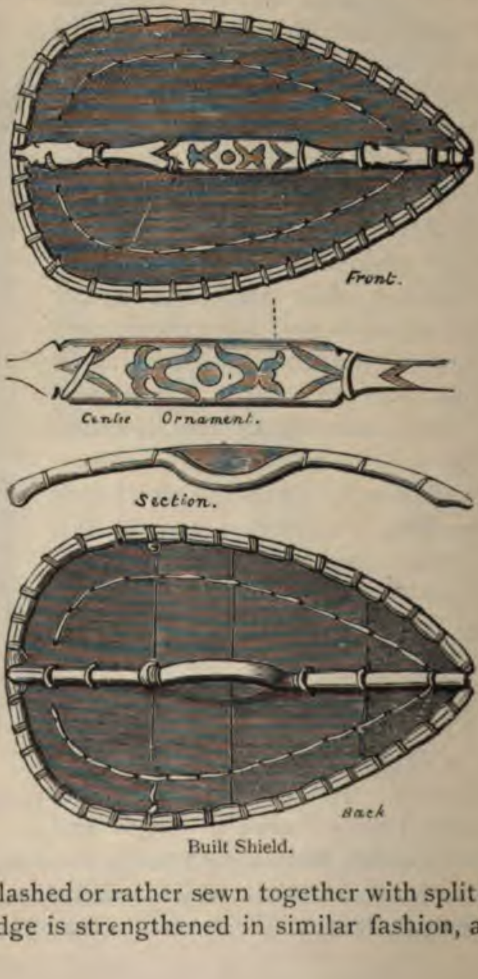
It is very seldom that the Australian savage leaves his shield without some attempt at ornament. His notions of art are of the rudest possible nature, and at the best consist of lines cut so as to form a zigzag pattern. As the reader may see, even the heavy shield which was last described was ornamented with a sort of chequered pattern over its entire surface, while the characteristic band and zigzag is seen upon the others.

Painted Shield.

Colour is often employed by way of improving the ornament, a sort of vermilion and ochre being the principal hues. In a few instances, the pattern consists of graceful curves, as seen in the accompanying illustration; and in this instance the maker has been so proud of his success that he has filled the grooves with red paint.

On account of its very perfect workmanship, and the materials of which it is made, I have little doubt that the shield which is next figured is of Bornean workmanship. It is not a large shield, being only twenty inches in length and thirteen in width, but is remarkable for its graceful outline and the manner in which it is built up out of a number of pieces.

The body of this shield is made of a single piece of thin wood, which is black in colour, and backed by four pieces of another kind of wood, all being



Built Shield.

firmly lashed or rather sewn together with split rattan. The edge is strengthened in similar fashion, and the

mode in which the handle is fastened is singularly ingenious.

If it were simply attached to the composite woodwork of the shield, it would of necessity weaken it just where strength was required. But the maker has foreseen this result, and guarded against it in the following manner:—

Along the centre of the face of the shield he has placed an ornamented strip of hard and elastic wood, as seen in the uppermost figure. This piece of wood is of a bright yellow colour, contrasting strongly with its black background. The piece of wood which forms the handle is made of the same kind of wood, and is also as long as the shield. These two pieces of wood are placed exactly opposite each other, and are lashed together with rattan in such a manner that, instead of weakening, they strengthen the fabric.

The shield thus made is elastic, exceedingly strong, and only weighs a pound and a half.

Another remarkable wooden shield is that which is used by the Dyaks of Borneo.

This is large enough to cover the whole body, as may be seen by the figure of the Dyak on page 279. These shields are almost always painted with grotesque portraits of imaginary demons, who invariably have goggle eyes and enormous tusks projecting out of the mouth. A few of these shields are occupied by an entire human figure; but, as a rule, there are three demoniacal heads, a large one in the middle, and a smaller one above and below.

The shield is further decorated with tufts of hair, either black or dyed scarlet, and arranged in rows.

They are fastened to the shield in such a manner that they project from it for an inch or two. This structure is well shown in the accompanying figure.

Bornean Shield.

These hair-tufts, like those which decorate the parang, are trophies of slain enemies. Such, at all events, they are presumed to be, though I believe that in many cases the hair is obtained from other sources.

Wood, or wood and hide, more or less strengthened with metal, have been the chosen materials for shields from the siege of Troy to the present day. We will now take a few examples of shields in which hide plays a prominent part.

One of these shields is of import-

ance to us, as it has played some part in our modern history. I allude to the shield of cow's hide which is borne by the Zulu warrior. One of these shields is here represented, so as to give a front and back view.

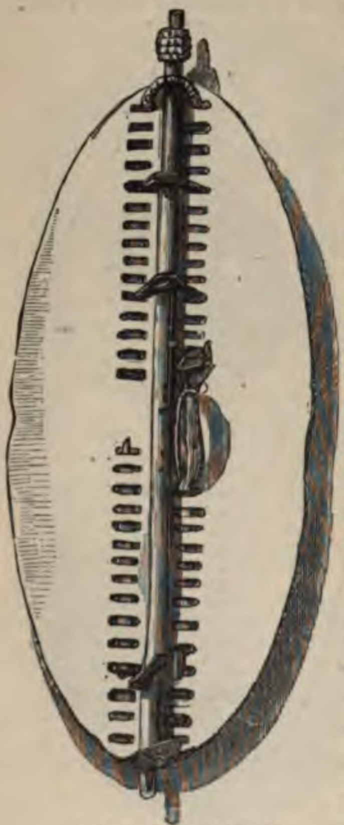
Zulu War-shield (Front).

Even in a pecuniary point of view, this shield is of exceeding value to the warrior. I have already mentioned that a Kafir of any tribe values cows above all the world beside. Moreover, cows are the standard of currency, so that, among those tribes, the word "pecuniary" has its literal signification—*i.e.*, pecus, or cattle.

Now a war-shield requires the entire skin of a cow for its manufacture, and therefore its possession renders its owner a man of some consideration. The reader may now understand why Chaka enforced so strictly the military law which forbade the loss of the shield under penalty of death.

The form of the shield may be seen from the illus-

tration. The peculiar barred ornament which runs on either side of the central line is produced as follows:—Slits are cut at regular intervals, and strips of hide of corresponding width are twined in and out, and beaten flat while wet. The shield-maker always contrives that these bars shall contrast with the colour of the shield, this rule being as strictly followed as the heraldic axiom of metal upon colour, and *vice versâ*. So, when the bars cross a piece of white hide, they are of some dark colour, such as black, red, or brown; whereas, when they cross a coloured portion, they are always white.



Zulu War-shield (Back).

The colours of the shield have as much significance in the eyes of a Zulu as the uniforms of our army or the emblazoned coat-of-arms upon the shields of the knights of old. The White Shield regiment, for example, is equivalent to our Life Guards, while the Black Shield force is composed of young men on their promotion. Hence, the

demand of the young warriors to "wash their spears," or, as we should say, to "flesh the maiden sword."

The shield which has been represented belonged to a man who had "washed" his spear, and therefore was entitled to a shield in which there was much white. The patches of black and red denote the particular regiment, like our "facings" of the present day.

The handle of the shield is a very remarkable one. It is composed of a staff about six feet in length, which is kept in its place by being pushed through loops of hide, as shown in the illustration.

Without this staff the shield would not be stiff enough for service. When carried, the arm passes through the central loop, and the hand grasps the staff. In the same hand are also held the five assagais which, as already mentioned in page 197, form the full equipment of a Zulu warrior.

To speak of the Zulu shield as an offensive weapon may seem absurd, but is yet perfectly correct. As is well known, some of the hand-bucklers of former years were furnished with a spike that projected from a central boss; but the Zulu shield is nothing more than a large oblong piece of cow-hide. Yet the Zulu warrior relies much on his shield as an adjunct to his spear.

When the Zulus charge, they rush forward with astonishing rapidity, yelling at the full pitch of their very powerful voices, and rattling their assagais against their shields. To those who live at home at ease, and decry from their desks the conduct of our soldiers when at war with a savage race, it seems to

be a mark of puerile cowardice to be disturbed by any amount of yelling and shield-clattering.

But no one who has not heard either sound can form the least idea of its real nature.

We think that the voice of the British costermonger affords the best example known of far-extending and ear-piercing power. But even the loudest shriek of the celebrated "leather-lunged Bill" would sound mild and gentle beside the blood-curdling yell of the savage. The clatter of the assagai against the shield, again, is like no other sound, and when several thousand dark forms are leaping about, uttering their war-yells and clattering their shields, it is no wonder that our horses could not be brought to face them.

Even the firm discipline and steady courage of the English soldier were sorely tried when the men faced the savage troops for the first time; and, as for the horses, it was not until they had undergone a special training that they could withstand the savage onslaught.

The upper part of the shield-staff is always adorned with a tuft of some description. This is made from fur cut in slips while fresh, and wound upon the staff so as to make the hairs radiate in a brushlike fashion.

The mode of carrying the shield and assagais while on the march is well shown by the accompanying illustration.

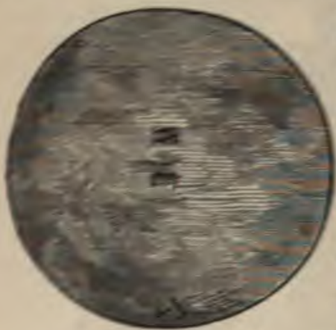
Two Zulu warriors, belonging to a defeated force, are making their way homewards. They are nearly perishing for want of food, and have drawn the "hunger-belt" tightly round their emaciated waists.

so as to dullen their sufferings. They have almost been driven to their last resource, but have still

Defeated Warriors on the Retreat.

their skin aprons which they have not yet eaten, and not until every other hope of obtaining food has vanished will they eat their shields.

These shields are so well prepared, that they can resist an assagai even if propelled by the strongest hand, and will even deflect a rifle bullet if it should strike them at an angle.


Circular Kafir Shield.

With some variations of shape and dimensions, this kind of shield is used by the whole Kafir race. The late Gordon Cumming, however, discovered a leathern shield of Kafir make, which bears so remarkable a resemblance to the shield of the North-American Indian, that when I first saw it in his collection I thought that an American shield had by some mistake been mixed with those of Southern Africa.

CHAPTER XXI.

THE SHIELD (CONCLUDED).

Shield used by the Fans—Elephant-hunting—A cunning device—Outwitting an old elephant—Shield of the North-American Indian—Skill in skin-dressing — Preparations for shield-making—The oven and the glue—Waterproof covering—Religious ceremonies—The Club and the shield—The Nubian shield—Ancient Egyptian soldiers—The Soudanese Arabs—Their activity—Weight of their swords—The wife and the shield—Benediction of the shields—Indian shields—Sword and Buckler men—Rhinoceros-hide—Studs, bosses, and inlaying—Target of the Highlander.

RETURNING once more to the Fan tribes, we might naturally expect that a people which could forge such effective axes, daggers, spears, missile knives, and poisoned cross-bow darts, would make some sort of defensive armour which was capable of resisting these formidable weapons.

However, they seem to prefer the actively offensive to defensive warfare, and therefore content themselves with a very simple shield, two forms of which are shown in the illustration.

These shields are very highly valued, and with reason, inasmuch as they are made from the skin of the elephant.

Not only must elephant-hide be the material, but the elephant must be an old one; and, moreover, the

only part of the skin which is thought strong enough for a shield is that of the shoulders. As, then, there is only enough material on the shoulder for two, or at the most three, shields, should the elephant be a very large one, it is evident that a good shield is considered as a valuable property.

Being armed only with spears, hatchets, and knives, the Fans have a very difficult task before them when

1 2

Fan Shields.

they want to make shields, for an old elephant is not only fierce and dangerous to approach, but is full of wiles and not easily decoyed into a trap. Pitfalls he always suspects, and so knowing do these creatures become, that when a herd had been decoyed into the approaches to a network of pitfalls, an old and experienced elephant stopped the others from advancing, went cautiously forward, and, by sounding the earth, discovered the pitfalls and unmasked them.

Almost the only trap which such an animal can be induced to enter is one in which art imitates

[redacted]

nature. The elephant is very cautious about approaching anything that looks like a fence, and so the Fans make use of the long and trailing "monkey-vines," and other tough creepers. They interlace them with the trees so as to form an enclosure, making them look as if they had naturally grown there, and avoiding all appearance of an artificial fence.

When an elephant is once decoyed into one of these traps, his fate is sealed. The animal has not the least idea what to do. If he could see a fence, he would have something definite to attack, but the forest presents its usual appearance, and yet he cannot escape. From all sides the armed foes begin to swarm. They creep through the bush and fling spears at him; they climb the trees and drop spears on him. When he gives chase, he finds himself entangled in the trailing creeper-stems, which yield to his furious rush, but never break.

So, at last, exhausted by loss of blood, he falls and is despatched. All the families in the neighbourhood feast on his flesh, the chief gets the tusks and teeth, and two or three warriors are furnished with the coveted shields.

WHEN the same material is used, a certain similarity of treatment must be employed; and so, when a shield is made of hide, some sort of preparation must be used in order to thicken and strengthen it.

The North-American Indian has brought this latter art to perfection. He has a perfect genius for the treatment of hides, and can at will convert that

of the bison into a robe, flexible and pliant as silk, and so artfully dressed that it may be soaked with rain all day, and yet, when dried, it will be as soft and pliant as before.

From the same hide he can also make his shield, and therefore has to impart to the skin directly opposite qualities.

Although the shield is quite a small one (only about thirty inches in diameter), the entire hide of a full-grown bull bison is needed in its manufacture. The maker begins his work by boiling down the hoofs, the skin of the hocks and shanks, and similar useless portions, into a very strong glue, the animal furnishing just enough glue for one shield. Meanwhile, his assistants have removed all the hair, for these Indians, unlike the Kafir tribes, prefer to have both surfaces of the shield alike. Moreover, if the hair were allowed to remain, the process of dressing the hide would be a very difficult one.

The first process in the actual manufacture of the shield is to dig a circular hole in the ground, taking care to make it exactly the size of the intended shield. In the hole is made a fire, which is gradually fed in such a manner that the hole is entirely filled with smouldering wood, and becomes a sort of oven, which will retain its heat for a very long time, but never breaks into a blaze which would scorch the skin.

Next, a great number of little holes are made around the circumference of the hide, and it is then laid with its centre exactly over the middle of the oven. Sharply-pointed pegs are then driven into the ground through the holes, keeping the hide tightly

stretched, and held about three inches from the ground. These pegs are in charge of the shield-maker's assistants, and are never left unattended

North-American Indian Shield and Clubs.

until the work is completed, as, if even one or two of them were neglected, the shield would be spoiled.

As soon as the hide is stretched to the satisfaction of the maker, he spreads some glue over the middle

of it, and kneads and rubs it into the fibres. This treatment, together with the heat of the oven, causes the hide to contract. As it shrinks, the pegs are gradually withdrawn, and replaced nearer the centre. A fresh circle of hide is thus brought over the oven, and, when it is properly heated, is kneaded with glue after the same fashion, the glue never being spread more than an inch or two beyond the part which is immediately over the oven.

This process goes on until the whole of the glue is exhausted and the hide will contract no more. It is then allowed to remain, still affixed to the pegs, until the heat of the oven has gradually died out. By means of this process, the glue saturates the hide, and causes it to be fully twice as thick as it was at first.

When it is quite cold, it is cut and trimmed into shape, and, as a rule, is decorated with the "totem," or coat-of-arms, of its possessor. The totem is mostly an animal of some kind, but, in the shield which has been figured, it is a crescent moon painted in white on a green ground. The strength and toughness of this shield are really wonderful, and it scarcely yields in either respect to the elephant-hide shield of the Fans.

It has one drawback, namely, that, as it owes much of its strength to the glue with which it is saturated, it would lose its stiffness in heavy rain, and when it again dried would adhere to anything with which it was in contact. So the owner prepares a cover made of very thin but waterproof skins, and carefully draws the cover over it in wet weather.

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Shield-making is a very solemn business, and the aid of religion is always invoked during its progress. Beside the assistants who take charge of the pegs during the shrinking of the hide, there are others who keep up the sacred shield-dance round the oven, blow smoke from one of the sacred pipes over the hide, and utter invocations to the Great Spirit for the success of the undertaking, together with prayers that the shield may be invulnerable.

As we shall presently see, a similar idea concerning the sacred character of the shield prevails in several parts of Africa, the shields being consecrated before their owners go into action.

In order to show the comparative sizes of the weapons, two of the ordinary clubs have been introduced. That which occupies the front, and is terminated by a rounded head, seems to be an effective weapon, and is easy to handle; but the other club appears to be singularly awkward and clumsy, and to require all the care of the wielder to prevent the force of the blow from disarming him.

This specimen is quite a light and elegant one, but I have seen many examples where the handle is so wide that the hand cannot grasp it. As to the projecting blade, it varies extremely. Most of the clubs are armed with an ordinary spear-head, and in many cases a broken knife-blade has been utilised for the purpose. Some of the older clubs are armed with a sharp stone, while some have neither spike, blade, nor stone.

In spite of the apparent clumsiness of this form of club, the Indian warrior delights in covering it with

decoration so as to make it still more difficult to handle. He will cover it with scarlet cloth, hammer row after row of brass-headed nails into it, and hang so many branches of feathers, tufts of human hair, and other ornaments all over it, that I have often wondered how he can strike a blow with a weapon so encumbered.

ANOTHER, and perfectly distinct, leather shield has a very large range, and is used by a variety of tribes or nations inhabiting North Eastern Africa.


Nubian Shield.

It is almost identical with the shield that was carried by the soldiers of ancient Egypt, and the shield which has lately become so familiar to us in connexion with the Soudanese Arabs, exactly like that of the ancient Egyptians, even to the boss for the reception of the hand, and the eye-hole at the top for enabling the bearer to see his enemy without exposing his face.

The boss in the shield is rudely but ingeniously constructed of several pieces of hide, and, as the reader will see from the illustration, is put together first, and then sewn on the face of the shield. The material of which it is made is generally that of the hippopotamus, but the tough skin of the crocodile is sometimes substituted for it.

During the summer of 1884, a small party of

Soudanese Arabs were exhibited at the Crystal Palace, and their manager kindly allowed me to have several private interviews. The use which they made of their shields was most remarkable. When about to fight, they always crouched closely to the ground, so that they were completely covered by the shield, nothing being shown except the point of the spear, or the long sword-blade.

In this curious attitude they sprang about with wonderful activity, feinting and working round for an opening like two accomplished boxers. Seeing the ease with which their slight arms and small hands manipulated the sword, I took it to be a light weapon. Having been something of a swordsman in my younger days, I asked one of the men to allow me to handle the weapon. This he did with a little reluctance.

Indian Shield.

When I took the sword in my hand, I was astounded at its weight, and felt very much like Fitz-James when lifting the sword of Douglas. Yet it might be said of its owner, despite his slender form,—

> "As light it trembles in his hand,
> As in my grasp a hazel wand."

The left arm wielded the shield with as much address as the right arm brandished the sword or directed the spear. The gait of these barefooted Arabs was remarkably noble, and I was much struck

with that of the owner of the sword. He was married, and had his young wife with him. As soon as he had shown his skill with sword and shield, he rose upright, slung the shield over his left shoulder, and stalked away, his wife following behind with her hand resting on the upper edge of the shield.

Like other races of men, they seem to have a kind of veneration for their weapons, especially the shield.

Before going into action, they pile their shields in a heap, and rest their weapons upon them, the points nearly meeting in the centre, and their handles and shafts radiating on every side. Then they stand in a circle, and strike up a monotonous sort of incantation, becoming louder and louder, and more distinct, and having the word "Allah" pronounced simultaneously.

Then they stamped in unison and with wonderful force—it is really astonishing what a prodigious stamp a savage can execute with his bare feet,—then they rocked their bodies uniformly backwards and forwards, with a loud grunt at each bend, until they had worked themselves up to a great pitch of excitement.

Suddenly they ceased. Each man stooped, took up his sword or spear, slung the shield over his shoulder, and walked off as calmly as if the violent excitement of a minute before had never existed.

The last shield for which we can find space has been selected on account of the extreme beauty of its manufacture. This is made in India, and, like armour in general, varies much in point of ornament, according to the purse of the purchaser.

The beautiful specimen which is engraved on page 317 is one which would form part of the armour of a royal personage. It was in the collection of the late Sir Hope Grant, G.C.B., &c.

Like the "sword-and-buckler" men of the Middle Ages, almost every man who was capable of bearing arms was furnished with sword and shield. But the mere man-at-arms has to content himself with an ordinary sword, and a plain shield of hide, strengthened with iron; while the prince whom he serves has his sword-hilt and scabbard blazing with jewels, and his shield studded and plated with gold.

These bucklers, like the Highlander's "target,"

> "Whose brazen studs and tough bull-hide
> Had death so often dashed aside,"

are of very small size, seldom exceeding eighteen inches in diameter, and mostly being much less. The material of this shield is the hide of the rhinoceros, which, when properly treated, is partly translucent, and possesses a singularly rich colour. The bosses, or studs, are not of brass, like those of Roderick Dhu's target, but of gold, and the beautiful inlaid work around the edge is of the same metal.

CHAPTER XXII.

THE HELMET.

Antiquity of the Helmet—Feather-helmet of the Sandwich Islands—Its classical form—The "Greek Fret"—The Yellow Feather and its signification—The royal mantle—Feather idols and their helmets—A helmeted idol of wood—The Nuehr helmet—Its identity with the helmet of the ancient Egyptians—The steel cap of the Middle Ages—The Indian helmet—Its chain-mail curtain—The sliding nose-piece—Helmet of the Normans—William I. at Hastings—The "beaver" and its meaning—Feather Plumes—Horse-tails—Field of the Cloth of Gold—The General's plumes.

THE article of armour which naturally follows the shield—which protects the body and limbs—is the HELMET, which protects the head, and enables the wearer to feel secure as to his head, and therefore, to concentrate his attention upon his shield and sword.

The helmet is of unknown antiquity, and assumes such a variety of form, that if I were to give only a slight idea of all the known forms of this defensive head-dress, the whole of this work would not be nearly sufficient for the task.

Suppose that Captain Cook had lived in these days, and had just discovered the Sandwich Islands, I am inclined to think that some of the critics would

have denounced him as an impostor, on the strength of the helmet which is here figured. They would have said that no savage could have devised this helmet, and that it must have been executed by some one who was familiar with the armour of ancient Greece and Rome.

Sandwich Islands Helmet.

Yet the object is the genuine work of a semi-savage who had never seen a white man, and its origin is a mystery. No intermediate forms have ever been found, and we have to face the wonderful fact that the chiefs of the Sandwich Islanders wore

helmets which might have been taken from the head of Hector or Achilles. A similar enigma in ethnology is to be found, that the peculiar zig-zag pattern of ornamentation, which is popularly called the "Greek fret," was in use among the aborigines of tropical America before Columbus lived, the pattern being as bold and perfect as if it had been copied from an Etruscan vase.

The frame of this beautiful helmet is made of a sort of basket-work, so that it is extremely light; and into its surface are woven the scarlet and yellow feathers which belong exclusively to chiefs.

The yellow feather is the denoter of rank, and the more yellow that is seen upon the helmet or mantle the higher is the rank of the wearer.

It is no wonder that these feathers should have been selected as external marks of rank. A somewhat similar mode of denoting rank in this country is to be found in the number of ermine bars upon a peer's official robe, or the "stripes" that denote the rank of non-commissioned officers. There is a group of little birds called honey-eaters, which are often mistaken for humming-birds. One of these creatures (*Melithreptes pacifica*) is remarkable for possessing under each wing a single feather, barely an inch in length, and of a bright golden yellow. Great numbers of these birds, therefore, must be taken before such a helmet as this could be made or a royal mantle embroidered, and as the bird is not a common one, and difficult to capture when found, the feathers are valuable for their rarity, independent of their beauty of colour.

The mantle which was possessed by the family of Kamehameha measured eleven feet by four, and its manufacture had been incessantly carried on through nine consecutive reigns.

It is natural to expect that the Tahitans of old should lavish royal honours upon their idols; and accordingly we find the idols in question crowned with the helmet, which denotes rank, and covered entirely with the scarlet and yellow feathers, which none but a chief might wear.

One of these curious deities is given in the illustration on page 324, the original being now in the British Museum. It is of "heroic" size, and, in spite of its decided grotesqueness, it is modelled with wonderful power and freedom. The eyes are made of mother-of-pearl, and their centre is black, polished, and globular.

The figure on page 325 represents an ancient Tahitan idol, which I believe to be unique, and of which I am rather proud, having rescued it from impending destruction, and arrested the progress of decay. It is now in the British Museum.

This remarkable figure has the head, face, and helmet carved out of a solid piece of wood. The wood is very light in texture, and nearly white in colour.

But the head, face, and neck are covered with bark cloth, or "tappa," stained black, and evidently put on wet, and kneaded into all the interstices of the figure. Indeed, it fits so closely, that the figure had been in my possession for some time before I discovered it.

The open mouth of the figure is fitted with human teeth in the upper jaw, and fish teeth in the lower

Feather Idol.

jaw, and the eyes are of mother-of-pearl. The neck is not fixed to the shoulders, but terminates in a spike or pivot which fits into a socket in the upper part of the body, so that the head can be turned freely in every direction.

Sandwich Islands Idol.

The body is cut out of the same white wood, and, like the head, is covered with black tappa cloth. The arms are of very simple construction, being

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Nuehr

THE helmet which is h
Nuehr tribe.

contrary to usual custom, which makes a river the natural boundary of a nation, the Nuehr inhabit both sides of the river Nile.

Like the Fans, the Nuehr consider clothes as quite needless, but are inordinately fond of ornaments. One of these decorations very much resembles the bracelet weapons which have already been mentioned on page 97, as worn by the Djibba and Latooka tribes, though it is used for another purpose. Sir S. Baker noticed that the head chief, Joctian, wore an iron bracelet, from which several short and sharp blades projected, and asked the object of it. Joctian replied that it was an instrument intended for the correction of wives, and, by way of proof, pointed to his wife, whose back and arms were covered with scars.

If we look at the monumental relics of ancient Egypt, we shall find that certain regiments of soldiers are represented as wearing helmets exactly resembling in form the Nuehr helmet.

This head-dress is made of white cylindrical beads, which are threaded on string, and then woven together in a singularly ingenious manner. The historical reader may remember that, in the days when plate armour made human beings look like steel lobsters, the helmet was too heavy to be habitually worn. It was therefore hung at the saddle-bow, or perhaps, carried by an attendant until wanted, the owner contenting himself with a steel cap edged with chain-mail, the form of which was almost identical with the bead-helmet of the Nuehr.

Just as the highly-finished and gold-inlaid shield of an Indian prince is but a much-improved form of the Nubian shield, so we find in India an almost exact copy, as far as form goes, of the bead-helmet of the Nuehr. Both the beautiful specimens of Indian helmets which are here figured, were brought over by the late Sir Hope Grant, G.C.B.

Indian Helmets.

These helmets are made of polished steel, engraved and inlaid with various devices. All round the edge of the helmet is fastened a sort of curtain of chain-mail, which is very short over the forehead, but at the sides and behind is so long as to protect the whole of the neck from a sword-stroke or spear-thrust.

In front, there is a flat, slightly-curved steel bar, with floriated ends. This is for the protection of the face, and especially the nose, from the side-stroke of a sword. This bar slides up and down through a slot, so that, when it is drawn down in battle, it protects the face, but can be pushed up when the wearer is not actually engaged in combat. Otherwise, he would find his speech very much hindered,

eating very difficult, and drinking impossible. In fact, this sliding bar is only another form of the "beaver" of the tilting helmet. I need hardly mention that this word is simply a corruption of the French "buveur," *i.e.*, the mechanism that enables the wearer to drink.

If the reader will refer to the figure of the Norman cross-bowman on page 263, he will see that the front of the helmet is prolonged into a point, which descends as far as the nose. As, however, it is an integral portion of the helmet, it cannot be raised or lowered at will. Slight as is the bar, either in the Indian or Norman helmet, it acts as a mask, and conceals the features so that the wearer can scarcely be recognised.

The reader may remember that at the battle of Hastings, when a rumour flew through the Norman army that William was killed, he was obliged to take off his helmet before he could prove his identity. The nose-piece of his helmet would nearly as effectually have obscured his features, as the "beaver" of a much later date.

The ancient Greek helmets had a similar projection. The earlier commentators, not being acquainted with this fact, nor calling to mind the peculiar helmet of the Normans, were greatly puzzled with certain passages in which the spear is described as passing through this iron bar, and so into the brain.

Feathers of some sort are universal among helmets. In the Indian helmets which have just been desribed, the plumes are small, straight, and made of heron's feathers. They are placed in metal tubes which

guard. The right-hand l
the three plume-tubes
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CHAPTER XXIII.

BODY ARMOUR.

The Roman "Secutor"—A cuirass made of seals' teeth—Begharmi armour—Rope armour—Armour-belt—Chain armour—The Bornu cavalry—The Norman cross-bow man—The Knights Templars—Indian chain-mail—Japanese armour—Japan and China—The Crest—Lion of the Black Prince.

DEFENSIVE armour for the body and limbs is nearly as ancient as the shield and the helmet, and takes so great a variety of forms that I must restrict myself to a very few typical examples, and merely mention those forms which are familiar to us.

The shield would only protect the body, and, perhaps, the upper part of the legs. But it would not protect the arm which wielded the weapon, and therefore it is but natural that man should have devised certain coverings which would protect those exposed portions.

So we will take an example which is familiar to all classical scholars. The "secutor," *i.e.*, the follower, who had to fight the "retiarius," or net-man, in the arena, had to be armed as strongly as possible, so as to be defended against the terrible points of the long-handled trident, which could strike the secutor

while the enemy was far beyond the reach of his short sword.

As, however, he had to chase the retiarius, who carried nothing but his net and trident, every ounce of needless armour was a hindrance to him, and therefore he only wore armour on his head, right arm, and right leg, the rest of the body being without any protection.

That the people of the flint and stone epochs wore armour is very probable from analogy with corresponding races of the present day. But, as this armour must have been made of vegetable or animal substances, no specimen could have survived to the present day.

Even if such a cuirass as is here shown had been worn, the whole of the vegetable material must have perished in the course of so many ages, and there could have been no indications in the pierced seals' teeth, of which it is made, to tell the discoverer that these teeth were once strung together so as to form a cuirass.

An archæologist might, with good reason, have conjectured that the man in whose tomb they were found had been a very great personage, and had been adorned in life with a vast number of tooth necklaces, armlets, bracelets, anklets, and waist-belts. But he would never have conjectured that they once formed a cuirass unless he had seen the remarkable object which is here figured.

The conjecture that they had once been employed as decorations would have been strengthened by the fact that, until the Sandwich Islanders began to

py European manners, such ornaments were used dancers, so as to produce a rhythmic clatter in cordance with the movements of their feet and

Sandwich Island Cuirass made of Seals' Teeth.

rms. The cuirass from which this drawing was ken is in the museum of the United Service.

Protection for the body might be obtained from various animals. A large tortoise or turtle-shell formed an almost ready-made buckler, target, or shield, according to its size; and the skins of such creatures as the manis, armadillo, crocodile, and some of the large-scaled fishes, could easily be made into armour which was impenetrable by the weapons to which they would be opposed.

In those countries, however, where such materials could not be procured, it was still possible to make efficient armour from the vegetable world. It may be remembered that the clumsy and graceless dress which was habitually worn by James I. was, in point of fact, a suit of very thick armour made of soft padding. In his case the material was silk, but the Chinese used vegetable fibre for the same purpose, finding that the rifle-bullet exhausted its power in twisting itself among the fibres, and did not penetrate the fabric. They were obliged, however, to abandon their padded armour after a time, as the cotton-wool was apt to take fire in battle, so that the wearers were slowly burned to death, being unable to free themselves from their cumbrous armour.

A very similar description of armour is that which is worn by the Begharmi lancers. This nation inhabits a large district near Lake Chad, in West Central Africa.

They are essentially a military people, and almost always at war with the neighbouring kingdom of Bornu, respecting which I shall have something to say in the course of this chapter.

The Begharmis are individually brave, and are

celebrated for their skill in boxing. This sport is by no means child's play, a fatal result to the struggle being quite a usual event. Professional boxers are as well known as used to be the case in England

Begharmi Guardsman.

at the beginning of the century, and it is a point of honour among the great men to have several professionals among their followers.

The portion of their army which concerns us at present is the lancer cavalry. This remarkable force is not employed, like our own cavalry, for sudden and swift action, and pursuit of a flying enemy, but is used as the van and rear guard. Both men and horses are covered with thick coatings of quilted mail, much like that of the Protestant Justice so humorously described in "Peveril of the Peak." Although so thick, it is very light, and, except that it is a very hot kind of clothing for such a latitude (between 10° and 15° N.), it answers its purpose very well.

It is, however, so clumsy that to hold the bridle in the usual manner would be extremely fatiguing to the bridle-arm. So the front of the saddle is made exceedingly high, and is bent forward so as to form a convenient rest for the hand. The back of the saddle rises to a nearly equal height, so that, when the rider is seated, it is almost impossible that he can be thrown.

A very ingenious vegetable armour is made by the inhabitants of the Kingsmill Islands.

The reader may remember that the ferocious people who inhabit that group of islands are in the habit of arming their weapons with sharks' teeth, which are as sharp-edged as so many lancet-blades. In order to guard their otherwise naked limbs and bodies against these weapons, they have invented a kind of armour which affords a perfect protection from these terrible weapons.

It is made of cords twisted from cocoa-nut fibre, and is very thick and strong. It is plaited so as to

form two portions, the upper part of which protects the body and arms, and the lower the legs. The specimen from which the drawing was taken is in the United Service Museum.

Kingsmill Islands' Suit of Armour.

On page 135 is represented the shark-tooth gauntlet of Samoa, and the reader will remember that the chief object of this extraordinary weapon is to rip up the enemy with one hand, while he is held with the other. In order to guard himself agai
weapon, the warrior takes care to protect

Samoan Armour Belt.

of the body which is usually attacked, and when he goes into battle girds himself with the belt which is here shown.

The figure was drawn from a specimen in my collection. It measured two feet nine inches in length, and was so wide that it protected the whole front of the body from the arms to the hip. The pattern of the belt is not the same as that of the Kingsmill Islands' mail, being much simpler, and very much like that of an ordinary door-mat. Being nearly as thick as the mat in question, it answered its purpose as effectively as if it were made of steel.

I have repeatedly drawn the attention of the reader to the fact that metal-workers, whether engaged in the arts of peace or war, copy in bronze, brass, iron, or steel, the weapons and implements which were formerly made of inferior materials. For example, scale-armour

Bornu Cavalry.

is only an imitation of the manis-scale breastplate which has already been mentioned, while the gradual development of plate-armour began by a reproduction in metal of the armadillo-plate cuirass.

So the partly-civilised Bornu has clothed himself with defensive armour which is exactly similar in principle to that of the Kingsmill Islander.

No vegetable fibre could withstand the thrust of a horseman's lance or the repeated strokes of a well-tempered sword. The Begharmis have certainly contrived to protect themselves fairly with their huge masses of quilted armour, but at the expense of speed of horse and activity of man.

Their constant enemies have armed themselves after a much better fashion. They have made mail-coats of iron chain-work, and have covered the whole of the body and legs with this protection. The coat is divided behind from the waist downwards, so as to enable it to fall over the body of the horse on each side, while the legs are encased in rather tightly-fitting mail of the same character. Chain curtains, very much like those of the Indian helmets, fall around the face, and are brought under the chin so as to protect the throat.

The horse has no chain-mail covering like the cotton armour of the Begharmi. But the more vulnerable portion, such as the neck, sides of the head, throat, and breast, are protected by flat plates of iron strung together as shown in the illustration. The peculiar spear of these horsemen, with its slender shaft, long, leaf-shaped head, and spud-like armature at the but end, has already been mentioned.

If the reader will again refer to the illustration of the Norman cross-bowman, he will see that the soldier is armed with chain-mail, which is simply the cocoa-nut fibre suit of the Kingsmill Islander reproduced in iron. The historical reader will also remember that the armour of the Knights Templars was of the same character, as is shown by the many effigy-tombs which still remain to us, the crossed legs of the warrior telling us that he had fought for the Holy Sepulchre.

Indian Body Armour.

As the Indian warrior defended his face and neck by a curtain of chain-mail depending from his helmet, he was not likely to allow the rest of his body to be without a similar protection. Accordingly, there

is no museum of Indian manufactures in which we do not find several examples of mail shirts.

One of these beautiful works of art is shown in the illustration on page 341, and was drawn from a specimen in Sir Hope Grant's collection, to which reference has several times been made. Not only is it made of the finest steel, and exceedingly light, but the chief for whom it was made was a Mahommedan, and, in consequence, has had a sentence of the Koran engraved on each link. Seeing that each link is made of hammered steel, and that each must have been separately engraven, the amount of pains which must have been taken is almost incredible.

In order to show the character of these rings, I have had three drawn of the full size. If the reader will just look at these three rings, and then at the coat itself, he will appreciate the value of such a piece of armour.

As, however, the sleeves of this mail-coat do not cover the hands and wrist, a gauntlet is used in addition so as not only to guard those weak spots, but to give additional protection to the arm nearly as far as the elbow. The stiff leather gauntlets of our cavalry soldiers are intended for the same purpose.

Indian Gauntlet.

One of these gauntlets is here shown, and belonged to the mail suit which has just been described. Our swordsmen would find it very much in their way, and that they

could not deliver a fair stroke when this gauntlet hindered the movement of their wrists. But we must remember that the gauntlet was made, not for an English but an Indian swordsman, and the two modes of handling the weapon are quite distinct. Many of the Indian swords have the gauntlet forming part of the hilt.

The two suits of Japanese armour figured on page 345 are given for several reasons.

In the first place, they are singularly interesting, as showing the development of defensive armour in this wonderful country.

Although Japan and China are often confounded together, they are absolutely distinct. The faces of the Japanese and Chinese are wholly different, and so are their minds.

A Chinese lives for the past, and reserves all his veneration for his ancestors, while the Japanese looks to the future.

The Chinese thinks his race, and therefore himself, to be of Celestial origin, and incapable of improvement. The Japanese is, if anything, too ready to seize upon other civilisations, and to bring them to bear upon himself.

The Chinese utterly repudiates reform, while the Japanese is essentially a self-reformer. See, for example, the voluntary abdication of the Daimios—an act of political foresight and personal abnegation which is unparalleled in the history of the world.

For ages they were the personifications of exclusiveness, not allowing a foreigner to set foot on their sacred soil. But their minds were open to convic-

tion, and then they threw all their former exclusiveness to the winds, and welcomed Western ideas with astonishing rapidity.

The Chinese emigrates to Western lands in order to act as a servant, and when, by dint of the most rigid economy, he has saved the sum of money which he thinks sufficient for the purpose, he will return to his own country, and live like a gentleman at ease for the remainder of his life.

Not many years ago it was a capital crime for a Japanese to leave the country. Now they are actually sent abroad by their own Government, not to act as servants, but to learn the arts of the once-despised and hated foreigner, and, on their return, to impart them to their own countrymen.

As if to show more completely the total change which the Japanese have instituted, the present Emperor, Mutsu Hito, wears the European dress, allows all his hair to grow, instead of restricting it to the little turn-up queue, and wears a moustache and small, pointed beard.

It is, therefore, as little likely that the Japanese should manufacture any more armour as that we ourselves should do so, and I have, therefore, introduced these two suits of armour as examples of a recently vanished phase of civilisation.

In both of these specimens we cannot but be struck with the remarkable form of the helmet. In the first specimen, the projecting horns exactly resemble those which in a North American chief denote the highest military rank, and are equivalent to a field-marshal's *bâton* among ourselves.

Japanese Armour (1).

Japanese Armour (2).

There is an infinite variety of these crests, which, like those of our own mediæval knights, are made of very light materials. The lion which surmounts the helmet of the Black Prince, in Canterbury Cathedral, is made of similarly light materials, as otherwise the weight of the helmet would be unendurable.

Instead of possessing a nose-piece, like that of the Norman or the Indian, or a beaver such as has already been mentioned, the Japanese helmet is furnished with a metal mask, which covers the face and cheeks as far as the eyes. In order to give it a more horrid aspect, the lower part of the mask is fitted with a large grey beard.

The armour represented in the first figure is made of plates, which are wonderfully like those of the armadillo cuirass, which has already been mentioned; while that of the second is almost entirely composed of oblong scales, the breast-plate excepted.

In the armour of the ordinary fighting-man, the steel, although of good quality, is quite plain, and coloured black; whereas that of a noble possesses a peculiarly silky polish or gloss, and is covered with elaborate patterns inlaid in gold.

[redacted]

CHAPTER XXIV.

THE LASSO AND BOLAS.

Missile Cord-weapons—The Lasso—The three forms of the weapon—The hide lasso; its strength and elasticity—Greasing the hide—The silk-grass lasso—Mode of forming the loop—The hair lasso—A singular fortress—Mode of using the weapon—Forming the noose—Whirling the lasso—Horse-catching and taming—A short and sharp struggle—The lasso in war—Evading the lasso—Killing the puma—The Bolas; their structure and use—The two kinds of bolas—Guanaco hunting—Horse-catching—Hunting the Rhea—The Eskimo bird-sling, and mode of throwing it.

BEFORE passing to the arts of peace, we will devote a small space to Cord Missiles, against which no armour is any protection. We have already seen the sling, which casts a stone, and the "ounep," which casts a spear. But in both these cases the effect is produced, not by the cords, but by the missiles which they propel. We will now turn to those which are themselves the weapons of offence.

The first of these is the Lasso.

This celebrated weapon was, in the time of Herodotus, a well-known instrument of warfare, but is now restricted to certain parts of America. The material of which it is made depends much on the locality.

The best are those which are made from raw hide plaited into a rope-like form, as at Fig. 5. The

Lassos.

[redacted]

strength and elasticity of this lasso are wonderful. It is barely three-eighths of an inch in diameter, and yet the strongest bull cannot break it. Indeed, experienced travellers say that it could hold an elephant.

As raw hide becomes stiff and hard when dry, especially if it has been wetted, the rope must, therefore, be kept greased until it is as pliable as silk, and quite impervious to water. At one extremity an iron ring is fixed, the ingenious plaiting by which the loop is formed being seen at Fig. 4. The reader will notice that near the ring the plait is square instead of circular, and at Fig. 3 is shown the ingenious manner in which the transition is accomplished.

Its length is forty feet, and when not actually in use it is coiled and carried at the saddle-bow, where it is held by a strap and button. Even the button is made of hide, and is almost identical with the "Turk's head" of our sailors.

The second kind of lasso is found more southwards. It is made of silk-grass fibre, which, as the reader may remember, is so strong that a fibre no thicker than a hair feels as strong as copper-wire of similar diameter, and will often cut the fingers when a person handles it incautiously when trying to break it. There is no iron ring in this weapon, the extremity terminating in a peculiarly-formed loop, shown at Fig. 6. The interior of the loop is lined with strong, and well-greased hide, so that the rope can run freely through it, while the exterior is generally adorned with coloured wool.

The third kind of lasso is called the "cabrestas,"

or sometimes the "lariat," the word being a corruption of the French "l'arrêt."

This weapon is made of horsehair, and has a special virtue of its own. As it must necessarily be of the same diameter throughout, the hairs must be evenly distributed throughout its length, so that when it is finished the ends of the hairs project in all directions, as they do in a bottle brush. The concluding operation is to trim off the hairs; but in a short time they are sure to work their way out again, though not to any great extent.

It has been found by experience that no snake will cross a lariat, the projecting hairs pricking its body between the scales of the under surface of its body. The hunters, therefore, can camp out in perfect safety, and, even in places where venomous serpents are known to abound, all they have to do is to surround their sleeping-place with the lariat.

Whatever may be the material of the lasso, the mode of using it is the same. Though it can be used on foot, it is essentially a horseman's weapon, the end which is farthest from the loop being fastened to the saddle.

As the mode of throwing it is not generally known, I will try to explain it as it was expounded to me by Mr. Eaton Stone, the celebrated traveller and horse-tamer. Book-illustrations almost invariably mislead the reader. The artist has heard that the horseman keeps the noose whirling round his head until it is thrown, and always represents him as holding the rope at some distance from the noose. A moment's reflection tells the reader that, if this were done, the

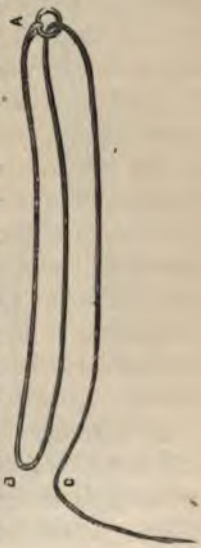
ring would at once run up the cord, so that the noose would abolish itself.

The real method is as follows:—

The hunter takes the ring in his right hand, and the cord in his left, and separates his hands to the full stretch, making a loop of about five feet in length, *i.e.*, from A to B in the illustration. Grasping all three ends at B, he drops the loop end, A, and shifts his right hand to B, putting it through the bight, and including the cord at C. The remaining coils of the lasso he takes on his left arm.

This operation, although it takes some little time to write, and even to read, is only the work of a second.

Raising his right hand above his head, the hunter swings the loop round and round, after the manner of a sling, the movement being from the wrist, and not from the arm. When he is within range of his object, he launches the loop exactly as if it were a sling, and simultaneously flings the coils off his left arm.



Loop of Lasso.

No sooner is the rope launched than the loop flies open, and rushes through the air, slightly lessening in diameter, until it falls upon the object.

The feat looks absurdly easy when it is seen, but

its real difficulty can only be appreciated by trying to perform it.

The native lasso-throwers are so expert that the possibility of a failure never enters their imaginations; and so absolutely certain of their aim are they, that they can not only catch a horse or a wild bull at full speed, but drop the lasso over one horn or both, catch the animal by the tail, if needed, or encircle either of its legs in the noose.

The capture and taming of a wild horse is an every-day feat among these people.

Having made choice of a horse, the hunter, mounted on a trained steed, gives chase, and as soon as he is within reach of the chosen animal he hurls his lasso and drops the noose over the animal's neck. As soon as the noose falls, his horse, who takes as much interest in the chase as his rider does, halts, and fixes his feet firmly against the ground, leaning away from the captured animal, so as not to be pulled over by the sudden jerk of the tightened lasso.

In a moment the victim reaches the full length of the lasso, and is suddenly "brought up" by it, the noose tightening itself round the creature's neck, and flinging it on the ground, gasping for want of breath. The hunter immediately dismounts, taking with him another cord, and, while the animal is lying senseless on the ground, he lashes its fore feet together, and with his second rope, which we will call the halter, makes a "hitch" over its lower jaw.

Retaining both the lasso and the halter, he moves off a little, and relaxes the lasso, which all this time

Lassoing Horses.

has been kept tight by judicious management on the part of his horse. After regaining its breath, the horse scrambles to its feet, and, finding its fore feet hobbled, kicks and leaps desperately in order to free itself from its shackles.

The man rather encourages this process, as he wants the horse to be convinced of the futility of struggling; and, if it should be a horse of exceptionally high spirit, he may be obliged to choke the animal afresh more than once, and lay it prostrate on the ground.

When it acknowledges itself to be entirely beaten, and ceases to struggle, the man advances slowly towards it, as shown in the illustration, and places one hand over its eyes, and the other on its nostrils. He then breathes strongly into the nostrils, and knows that the animal is entirely overcome.

Still allowing the hobbles to remain on its feet, he forces a bit into its mouth, and leads it in different directions, until the animal finds that it can have no will of its own. He then mounts it, and finally removes the hobbles. The whole of the process is accomplished with such quiet and certain skill that, within the short space of an hour, a horse which was as free as air, and never acknowledged any master but the leader of his own herd, will be as completely the servant of his captor as if he had been born in servitude.

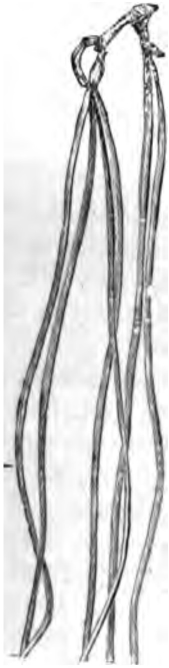
In battle, the object of the lasso is mostly to fling down the horse of the foe, so as to enable the assailant to kill him before he recovers from the shock. Of course, if the rider himself could be caught, so

much the better for the assailant. But, as a rule, it is of very little use to aim the lasso at the rider; for, as soon as he sees it, he drops off the back of the horse, and lies along its side, supporting himself partly by one elbow, which lodges in a plaited loop which is attached to the horse's neck, and partly by one heel, which he hitches over its back. The lasso-loop thus glides off the back of the horse, while the rider, though he be lying in this curious posture, and the horse be going at full speed, launches arrow after arrow at his assailant, aiming them from below the animal's neck.

If there be not time for this manœuvre, the warrior snatches his knife from its sheath, and, as the leathern loop falls over his shoulders, receives it on the edge of the knife, so that it is severed by its own force.

A native hunter will even kill the puma with the lasso. Throwing it over the animal's neck, he puts his horse to full speed. As the rope tightens, the sudden jerk throws the puma off its feet, nor is it allowed to regain them, its body bounding and rebounding off the earth as the hunter dashes along, until it is quite senseless and can be killed without danger.

THE lasso, invaluable weapon as it is, has one defect, namely, the shortness of its range. As I have already mentioned, its usual length is forty feet, so that, when the noose and the fastening to the saddle are deducted, the actual range does not much exceed twenty-five feet. Some lassos, however, are sixty feet long.



of leathern thongs

[redacted]

The balls are generally made of stone, but the most valuable are those which, as in our present example, are of copper. Each of these balls weighs a pound and a half. The thongs to which they are attached are nearly five feet in length, so that, when the balls are separated and whirled in the air, or when thrown, they cover a circle of ten feet in diameter.

They are slight, but enormously strong, being made of several strands of raw hide twisted together, and, as may be seen by the illustration, they are doubled throughout their length. Each of the balls is enclosed in a sort of pocket made of raw hide. It is worked over the ball while still wet and fresh from the animal, and then attached to the thong as seen in the figure. In a three-thong bolas (called "achico"), one of the thongs is usually about a foot longer than the others. The two-thong bolas are called "somai."

As is the case with the lasso, the thongs are kept well greased so as to be quite soft and pliable. The Patagonian hardly ever parts from his bolas, and when he leaves his hut he carries the bolas coiled round his waist in such a manner that he can cast them off in a moment when they are needed.

There are two modes of using this weapon. It can be employed as a club, if the owner can come within close quarters, or as a lasso if he requires a long range.

In the former case, the ball attached to the longer thong is retained in the hand, and the others are swung or thrown at the animal which is to be struck.

In the latter case, the hunter grasps the junction of the thongs, and swings the balls round and round over his head, just as is done with the lasso. When he comes within range, he launches the bolas at his quarry. As soon as the weapon leaves his hand, the rotatory movement causes the balls to diverge, so that the thongs look like the spokes of a wheel as the weapon rushes whirling through the air. When it strikes, the thongs are coiled round the body and limbs, and the animal is at once rendered helpless.

The bolas are chiefly used for the capture of the Guanaco (or huanaco), one of the llamas. It is a wonderfully swift-footed animal, running in herds of some twenty or thirty in number, and scampering like goats among rocks where even the unshod horse cannot follow them.

Great care and forethought are needed in order to come within range of these animals, for each herd is under the charge of an old and experienced leader. If the hunters can only kill the leader, the rest of the herd are like sheep without a shepherd, and run about aimlessly and within reach of their pursuers, so that many of them are killed in a few minutes.

The equally swift-footed Rhea, or American ostrich, is also killed by means of the bolas, the hunters being so expert that they can either cause the thongs to encircle an animal's throat and choke it, or merely entangle its legs and throw it down. The latter plan is adopted when wild or escaped horses are pursued.

In horse-catching, a rather peculiar device is employed. If the animal were suddenly thrown down when at full speed, it would probably sustain severe

our ancestors, except that it is intentionally made stiff in the body and neck, so as to withstand the force of the bola perdida.

Bird Sling.

THE last of these weapons for which space can be found is a sort of many-balled bolas on a very small scale.

It is composed of seven or eight very slight cords, not thicker than ordinary twine, but very strong, being made of sinew or the intestines of seals. At the end of each thong there is a weight, sometimes made of walrus ivory and sometimes of stone. In the specimen which is engraved in the figure the weights are of ivory, as are those of a very good specimen in the Ashmolean Museum at Oxford.

This implement, for it cannot take rank as a weapon, is intended for capturing birds when on the wing, and is used by the Eskimos. The man conceals himself behind an ice-peak or similar shelter, and when any birds come within range he hurls his bird-sling at them, making it whirl in the air with all the thongs radiating, just as is done on a larger scale by the Patagonian who has just been described.

The circle which is formed by the revolving thongs is about five feet in diameter, and if a bird should be struck with one of the weights or thongs, the remainder coil themselves over its wings, and bring it to the ground.

CHAPTER XXV.

NAVIGATION—FLOATS AND CANOES.

Crossing water—Artificial supports — The Float — Assyrian swimmers—Fishing with floats—The Raft—The Shillock Raft-boat — Origin of the Canoe—The reed canoe of Australia—Bark canoes—Gradual improvement in structure—The Kruman canoe—Skill of the paddler—Peculiar form of this canoe—Guianan canoes—The "dug-out"—The "wood-skin"—The Waraw and Macoushi tribes—How to make a wood-skin—The birch-bark canoe of North America—"Portages"—Canoes of British Columbia—The Kayak of the Eskimo—Skilful paddling—The Oomiak, or woman's boat—Climate and material.

THAT man should allow streams, rivers, or even oceans, to divide him from his fellow-man, would be contrary to his very nature, and accordingly, whenever man is placed near rivers, lakes, or seas, he discovers some means of traversing the watery barrier.

Horace was very far wrong when he sang of the "robur et æs triplex," which girded the breast of him who first committed a barque to the deep; for, long before brass was discovered or the art of metal-working known, man had committed many a vessel to the deep in order to overpass the boundaries set by Nature.

The modes by which he has achieved this task

vary exceedingly, but are all based on the same principle, namely, that in order to float on the surface of river, lake, or sea, he must render himself lighter than an equal bulk of water.

It is not sufficient merely to be able to swim, for the most accomplished swimmer in the world can only remain in the water for a limited time, and is, moreover, unable to overcome the obstacles offered

Assyrians Swimming with Inflated Skins.

by tides and storms. Moreover, there are so many who cannot swim, that, if they could not employ some artificial mode of crossing the water, their lives would be limited to their own sides of any river on whose banks their lot happened to be cast.

One very simple plan is to support the weight of the body by resting upon some floating object. The lighter the object, the greater is its sustaining power, and so we find that many centuries ago men were in

the habit of crossing water by resting their weight upon the inflated skins of animals. An example of this mode of sustaining the body is afforded by the ancient Assyrian sculptures, which record the history of that perished nation.

Sieges of fortified towns are in many plans portrayed, and in several of them the artist has described, in the conventional but graphic art of the period, the method in which the soldiers crossed the moat that surrounded the beleaguered city. In some cases, the men are armed, and are crossing for the attack, while, in others, the vanquished soldiers have cast away their weapons, and are trying to escape.

It is evident that the inflated skins were made expressly for the purpose, as each of them is furnished with a strap which passes round the waist of the swimmer.

A somewhat similar plan of sustaining the body in the water is adopted by the Kanemboos, a tribe that inhabits the shores of Lake Tchad.

The women and men fish in different modes.

When the women go fishing, which is a daily task, thirty or forty of them wade out as far as they can, and then form in single line. They then move towards the shore, which has a very gradual slope, and, by keeping up a constant splashing and beating the water, drive the fish before them, taking care to direct their course to some small bay. By degrees, the fish are forced nearer and nearer to land, and into water which is half mud, until the women can stoop down, scoop out the fish with their hands, and fling them ashore.

Fishing Scene on Lake Tchad.

The men, however, employ another mode, by which they can take fish that are too large to be driven ashore.

The fisherman fastens two large empty gourds together by means of a stout bamboo, and loads them with his net. This is of considerable size, and along the upper edge are tied floats made of cane, while the lower edge is weighted with bags of sand tied up in skin bags.

When he has waded out until he is nearly up to his waist in the water, he sits astride the bamboo, and paddles with his hands until he reaches a suitable spot, where he "shoots" his nets. Having done this, he paddles round them at some distance, splashing and beating the water with a short club, so as to frighten the fish into the net.

He then returns, and hauls in his net, lifting it slowly with one hand, and in the other holding his club, with which he kills each fish as soon as its head appears above the surface. As the fish are killed, they are thrown into the gourds, and when these vessels are nearly filled the fisherman paddles to the shore, empties the gourds, and again returns to the net. As these people live almost entirely on fish, they are extremely expert in the art which gives them food.

A very similar mode of supporting the body in the water is employed by the fanatics who drown themselves in the Ganges as an offering to their deities.

They fasten a large earthen chatty, or jar, to each side of their waist-belts, and, thus supported, paddle themselves by their hands into mid-stream. The

intending suicide takes with him his drinking-cup, and with it fills the jars with water until they sink and carry him down with them. He is careful to pour water alternately into each jar, as, if he were to fill only one, the other would prevent him from sinking.

THE inflated skin, the gourd, and the jar serve only, as corks and life-buoys do among ourselves, to keep the body afloat in the water. This, however, is quite insufficient for man's needs, and he is obliged to invent some device which will bear him *above* the water. So, instead of merely using a float, the intending voyager would fasten together a number of floats, such, for example, as the trunks or large branches of trees, so as to form a raft which would bear his weight.

The next advance would be to make a raft which would not only sustain weight, but which could be guided at will. Such a raft is that which is in use at the present day on the Nile, and, as we know from the Egyptian monuments, was in use more than three thousand years ago.

Inhabiting the district on the west bank of the White Nile there is a great tribe or nation going by the name of Shillook. They are a bold and warlike people, and carry on an incessant feud with the Dinka nation, whose territories extend to the east bank opposite them. They are bold and reckless maurauders, making raids not only upon their hereditary enemies, the Dinkas, but travelling ,for great distances on the river, landing, hiding their vessels in

Shillooks crossing the River.

the reeds that fringe the banks, carrying off men, women and children, whom they sell as slaves, and plundering the whole country besides.

They have plenty of canoes, but make great use of the raft-canoe which is shown in the illustration. This simple vessel is made of the ambatch-tree (*Anemone mirabilis*), the wood of which is nearly as light as cork. This tree never grows to any great size, and so it is an easy task to fasten together a number of the slender stems in the shape of a long isosceles triangle, and to turn up the point, as seen in the illustration.

These vessels are so light that one of them can be carried by a single man, though, when floating in the water, it can bear the weight of two adults. Such a float will measure about nine feet in length, and four in width at the base.

Aided by these floats, the Shillooks performed a most daring feat.

It so happened that pasturage was very poor on the west bank of the river, but very good on the east side—in the country of the Dinkas. For some reason the Dinkas had abandoned the district along the bank of the Nile, and gone off into the interior.

The enterprising Shillooks obtained knowledge of this movement, and as soon as the Dinkas had evacuated the country the Shillooks crossed the river in great numbers, their cattle swimming after them, and took possession of the pasture.

Being good tacticians as well as brave soldiers, they ran an extemporised fortification round the

selected spot, built temporary houses for themselves, and fed their cattle.

In due time the Dinkas returned. But the Shillooks had stationed a chain of out-posts extending many miles inland, and, as soon as the Dinkas began their return march, the warning was conveyed to head-quarters. So, when the rightful inhabitants again took possession of their land, they found all their pasturage fed off, the Shillooks and their cattle being safe on the other bank of the river.

THE reader will remember that when the fishing-spear of Australia was under consideration, a casual mention was made of the tiny canoes which are used by the Australians, and which seem scarcely large enough to hold a small child. These canoes are constructed of various materials, and in the three following illustrations their chief varieties are shown.

The first figure represents a canoe which is interesting as showing a phase of boat-building. We have already seen how the Shillooks make their canoe-rafts by laying a number of very light poles parallel to each other, and then lashing them together. The ambatch-tree does not grow in Australia, but there are plenty of large reeds, and by laying them side by side and lashing them together a boat-raft is made as shown in the illustration opposite.

The specimen from which the figure is drawn may be seen in the British Museum.

Another advance in boat-building is to make a primitive canoe out of bark. Such a boat as this can be made in a few minutes.

The intending boat-maker looks about for a suitable "stringy bark" tree (a species of *Eucalyptus*), climbs it for a few feet, and then with his tomahawk cuts the bark completely through, all round the tree. He repeats this process about eight feet lower down, and then cuts a longitudinal slit from the upper to the lower ring. He cuts a similar slit on the opposite side of the tree, and then, by forcing the handle of the tomahawk under the bark, uses it as a lever, and strips the whole of the bark off the tree.

He now has two bark troughs without ends, and proceeds to form one of them into a boat. Should he be alone, he thinks that tying the ends firmly together will answer every purpose. So imperfect a boat is sure to leak, but he can with one foot scoop out the water as fast as it comes in, so that a moderate amount of leakage is of no consequence.

Reed Canoe.

If, however, he should have a companion, so that there is

more strain on the boat, he digs some clay from the river's bank, partly ties up the ends of the canoe, then forces clay into the hollow, and finally binds the flexible ends of the stringy bark over the clay.

So simple is the operation, that an expert artificer can make two such boats in less time than has been occupied in writing the description.

When the immediate use of the boat is fulfilled, it is abandoned, as there is no object in retaining it.

The upper figure in the next illustration shows a decided advance in the art of boat-building. The bark trough is first softened by heat and moisture, and the ends are then sewn together so as to produce an approximation to the shape of a canoe. Even in this improved boat the clay has to be used freely.

The figure was drawn from a specimen in the river Murray.

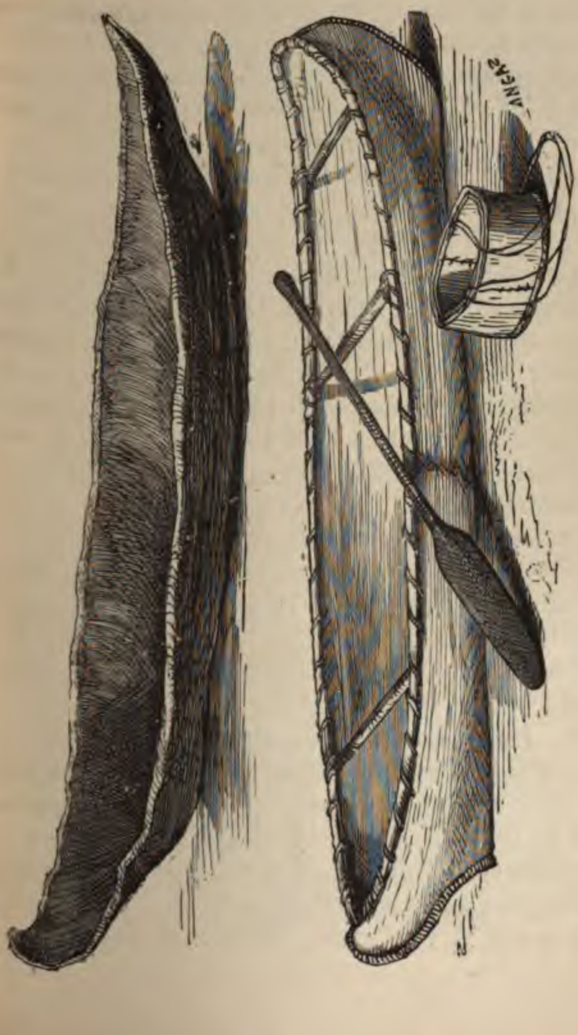
The last of these three canoes shows a wonderful improvement on the others.

The sheets of stringy bark still furnish the material, but it is worked with a carefulness of execution and a decision of plan that must remind the reader of the birch-bark canoes of the North-American Indians.

There is a decided difference in the two ends of the canoe, one being evidently the bow, and having a sort of cutwater, while the other is as evidently the stern.

The sides are kept apart by means of cross-sticks, which also add much strength to the fabric, and the gunwales are strengthened and prevented from be-

coming torn, by a layer of reeds lashed, or rather sewn, to them; a similar protection is extended to the bow and stern.



Australian Canoes

Moreover, instead of being content with the blade of the fish-spear as a paddle (see p. 209), the native has made a rough but very effective paddle, such as is shown in the illustration. Another useful adjunct to the canoe is shown in the figure. It is a sort of shallow bucket, made of the ever-useful stringy bark, and used indifferently as a water-vessel or as a dipper wherewith to bale water out of the canoe.

This kind of canoe is in use on the north-east coast of Australia.

THE canoe which is shown in the accompanying illustration seems scarcely better than the last-mentioned Australian boat. It is, however, a much superior work of art, both in material, design, and execution, and, when handled by a Kruman, can ride uninjured over seas which would swamp the best boat that an Australian ever made, and would drown the boatman as well.

The canoe, well adapted as it is for its object, is of very simple construction, but has more right to the title of boat than any of those which have been already mentioned.

It is hollowed out of the trunk of a tree, the wood of which, like that of the ambatch, is exceedingly light. Partly by the adze, and partly by fire, the interior is hollowed, as shown in the illustration, and the sides of the canoe, now reduced to a shell, are kept in their places by cross-bars. On account of the lightness of the wood, there is no necessity for making the sides very thin, so that a canoe, when once made, is very strong, as well it may be, con-

sidering the violence of the seas over which it dances.

Even if it should be filled with water, it does not

Krumen and their Canoes.

sink, and the Kruman, who is rather more at home in the water than out of it, kicks the water out with one of his feet, tilting the canoe in the meanwhile, so as to make his kicks more efficacious. Sometimes the surf-waves of the Grain Coast are too much even for the practised skill of the boatman, and toss the canoe in a complete somersault. The Kruman is, however, by no means disconcerted, but rights the canoe, contrives to wriggle himself into it in eel-like fashion, kicks out the water, and is all right again.

The man seems as if he could do anything with his canoe. In the middle distance of the last illustration the boatman is shown as having his right leg over the side of the boat, while the knee of the other leg rests within it. This is the plan which he adopts when he wants to turn suddenly, and so expert is he at this manœuvre, that the boat whirls round just as a skater spins round on the ice. The rapidity of the movement in either case is greatly due to the curved outline of the boat and skate.

From his earliest childhood, the life of the Kruman is spent on the water, and he manages his little craft with such apparent ease, that Europeans often think that they can do the same, and with disastrous results, for they are no sooner in the boat than they are out of it. None but Hercules could wield the club of Hercules ; none but Ulysses could bend the bow of Ulysses ; and none but a Kruman can manage a Kruman's canoe.

The ordinary canoe of the natives of British Guiana is made on the same principle as that of the

Kruman, as may be seen from the accompanying figure.

It is popularly called by the name of curial or corial. It is hollowed by infinite pains out of the trunk of a large tree, and by means of wedges, cross-pieces, and the judicious use of fire and water, is brought into shape.

The Waraw tribe is [illegible] skill in canoe-making—[illegible] building—and some of their [illegible] large enough to hold fifty [illegible]

The reader [illegible]

tied up at the ends and plugged with clay, almost exactly like that of the Australian. Indeed, if it were not for the difference of the material, it would not be very easy to distinguish the one boat from the other. The bark of the locust-tree, or simiri (*Hymenæa courbarii*) is sometimes used for the same purpose.

The colonists, who have given this canoe the appropriate title of wood-skin, call the clay plug by the name of "back-dam," no matter whether it be used at the bow or stern.

Sometimes the natives are more ambitious, and convert the bark into a really good canoe. The rather elaborate process is thus described by Mr. C. B. Brown :—

"To make one of these wood-skins a large purple-heart tree is cut down, and the bark of the requisite length taken off. A wedge-shaped piece is then cut out of the trough-shaped bark, from the top downwards, at a distance of three feet or so from both ends on each side. The ends are then raised until the edges of the cut meet, when holes are pierced on either hand at a distance of six inches from the cut, and numbers of turns of a strong withe or liana, called mamuire, passed through them and made fast in a neat manner to a small round stick placed along the inside.

"Two strong pieces of wood, fastened across at the splits, prevent the sides from closing in. The ends are then trimmed down level with the sides, and a ticklish but serviceable little craft is turned out. The seats are made of curved pieces of the same bark and are very low.

"The whole process of making one of these wood-skins, including the drying of the bark, occupies a space of three weeks. In this period must be included, I think, some loss of time from laziness on the part of the Indian canoe-builder. Wood-skins vary in size, but usually are from fifteen to twenty-five feet in length, and an ordinary-sized one will carry three or four people, with their hammocks and provisions."


North-American Indian Model of a Canoe.

The locust-tree bark is nearly equally flexible, and answers fairly enough, as far as its canoe-making capabilities go. But it is, on an average, one-fifth of an inch in thickness, and so heavy that, if the canoe should happen to ship much water, it is sure to sink.

ALTHOUGH at first sight the birch-bark canoe of the North American Indians resembles that of the Australian, as figured on page 373, and even more closely resembles the wood-skin which has just been described, it is far superior to them both, and is, in fact, comparatively a work of art. Canoe-making is divided into two portions, the carpentering being done by the men, and the sewing and ornamental departments falling to the women.

The first part of the process is, that the men pick out a suitable birch-tree, and strip off the bark which is to form the skin, or "cloak," as it is called, of the future canoe. The women set to work upon it, scrape and work it while the moisture still remains in it, and cut and sew it when required, so as to make it approach the form which it will take when complete.

Meanwhile the men are preparing the wooden skeleton over which the cloak will be stretched. This is made of white cedar, and the principal portion of it is that which runs round the gunwale, and which is the chief support of the boat. This is called the "maître."

The ribs are made of the same material, and are lashed to the maître by bark cord, no nails or metal of any kind being used.

The skeleton being complete, the cloak is brought gradually over it, and sewn in various places until it is coaxed, not forced, into proper form. While the women are engaged on this part of the work, the men are preparing a quantity of cedar boards, not thicker than ordinary pasteboard. These are used as lining, and, except the necessary stopping of accidental holes, and ornamenting the sides with various patterns in coloured porcupine quills, the canoe is complete.

These canoes are so light that they draw very little water, and are therefore admirably suited for lake use, where the vegetation fringes the borders and extends some distance into the lake itself. Moreover, the rivers are often broken by falls, which not even a native boatman, with all his daring skill, likes

to descend, and which cannot be ascended by any boat.

The only plan, therefore, by which these difficulties can be surmounted is to unload the canoe, carry the boat and baggage beyond the impediment, and then launch the canoe afresh. Such spots are called "portages," and several will sometimes occur within a mile or two. It is, therefore, necessary that the canoe should be as light as possible.

Ordinary canoes, for conveying two or perhaps three people and their baggage, are so light that a single man can easily carry them. Much skill is required in the management of these fragile vessels, as the least inattention to balance will upset them. Yet the native canoe-men will even stand with a foot on each gunwale while their companion is guiding the boat down the rapids, and will spear fish as they fly through the foaming waters.

PASSING northwards to British Columbia, we find a very well-made form of canoe, which is represented on page 382.

At the present day, when the natives of British Columbia can obtain European tools, the manufacture of such a boat is much easier than in the days when the only adze that could be obtained was made of a large mussel-shell, fixed crosswise into a wooden handle. Even the preliminary task of cutting down the tree was a long and tedious one, the only tool being a rude chisel made from the horn of the wapiti stag (which the colonists *will* persist in calling by-

British Columbian Canoe.

the name of elk), and a wooden mallet, with which the chisel was struck.

When the tree was cut down and dubbed roughly into shape, it was hollowed by the joint action of the adze, chisel, and fire.

The next process is to get the future canoe into shape; and, in order to render the wood soft enough for this part of the work, the canoe is filled with water kept at the boiling point by red-hot stones continually dropped into it. This operation takes up several days, and is relegated to the women, who are told off in watches, so that the canoe shall be always kept full of boiling water.

After it is brought into shape, it is prevented from warping by sundry cross-bars, and when the water is emptied out, and the boat has dried very slowly, the exterior is hardened in the fire, and then decorated with various ornaments in black, red, and blue. We shall revert to these colours when we treat of the paddles with which these boats are propelled.

In fastening the cross-pieces, it is necessary to bore holes in the wood. This is done by means of a primitive drill made of bird-bone, and worked by means of the two hands. It is even now impossible to make a large canoe under six weeks, or more, of incessant labour; and in the former days the task must have occupied nearly double that time.

DISTINCT as they may seem to be, the celebrated Kayak of the Eskimo tribes is almost identical with the birch-bark canoe which has just been described.

As trees cannot grow in the regions inhabited by the Eskimo, so generation after generation of Eskimos pass away without seeing a tree, or forming any idea of the origin of the drift-wood which they prize so highly for the shafts of their spears and harpoons. The Eskimo, therefore, must look for other materials for constructing his boat; and, being unable to obtain them on land, he has recourse to the sea. Whalebone, or rather baleen, together with the ribs of the huge animal, serve for the skeleton of the boat; and the "cloak," instead of being made of the bark of a tree, is formed from the skin of the walrus, or other seal of great dimensions.

As the reader will see by referring to page 375, the outline of the kayak is almost identical with that of the Kruman's canoe, being sharply pointed at each end, much curved, and having no keel. The skin covering of the kayak does not only rise as high as the gunwale, but covers the whole of the boat. In its centre there is a hole just large enough to admit a man, and

[redacted]

round the hole is affixed a short, loose tube of soft waterproof skin. When the Eskimo seats himself, he has to introduce his legs and body through the tube. He then draws the tube almost under his arms, and ties it so firmly round his waist, that if a wave should fall on the boat, or even if it should be capsized, not a drop of water could find its way into the boat.

Indeed, an expert Eskimo will sometimes put this water-resisting capability to a severe test. He will deliberately upset his boat, and with a powerful stroke of the paddle cause it to turn completely round, righting himself with another paddle-stroke as he emerges from the water.

This is a most perilous feat, as the least failure would cause the kayak merely to turn bottom upwards, and leave him hanging head downwards in the water. Not even the most expert boatman will attempt this feat unless a trusty comrade is within reach.

It is needless to say that, if the "cloak" of the kayak be pierced or torn, the boat must sink, and that there would be scarcely time for the boatman to disengage himself. Yet, as we have already seen, the Eskimo will not only attack the ordinary seals, but even the gigantic walrus itself, though a single stroke from its pointed tusks would tear the kayak open and sink it.

On the deck, if we may so call it, of the kayak, the Eskimo carries the harpoons or spears which he is about to use, the point and but of each weapon passing under strips of whalebone that are fastened across each end of the boat.

The kayak (sometimes written as kajac, kyak, or kiak) is essentially a hunter's boat, carrying, as a rule, only a single man. There is, however, another kind of boat, called the "oomiak," which is meant for the transport of goods and women.

It is necessarily made of the same materials as the kayak, but is of totally different shape. In form it very much resembles one of our punts, but has upright sides about three feet in height. It is, in fact, nothing more than an oblong trough of skin.

Its "tonnage" is wonderfully great, for one of these boats, which measured twenty-five feet in length by eight in width and three in depth, was capable of carrying twenty human beings, together with their baggage.

The whole of the paddling is done by the women, and there is always one man in each oomiak who acts as coxswain. He is always an old man, who is too feeble to trust himself to the kayak, but whose experience enables him to manage the oomiak, and who is still strong enough to keep the women up to their work by throwing at the idlers an axe, or a knife, or a harpoon, or any other missile that may be at hand.

Clumsy as it may appear, the oomiak can carry a sail. The mast is necessarily short, and is stepped in a piece of wood fastened near the bow of the boat. The sail is very ingeniously constructed of the intestines of the walrus, which are slit open, flattened, and dried. Each strip is about four inches in width, and, when sewn together, a very effective and very light sail is formed from them.

[redacted]

The reader will probably have noted the manner in which the bark boats and the Eskimo kayak and oomiak carry out the influence of climate on material. The Guianan of the tropics and the Eskimo of the polar regions each require boats, and each can supply this want. But the Guianan canoes are made wholly from vegetable materials, while those of the Eskimo can be, and sometimes are, made entirely from animal substances. Moreover, in neither of them is there used one particle of any of the metals which boat-builders of Europe think to be absolutely necessary.

CHAPTER XXVI.

NAVIGATION (CONCLUDED)—SAILS AND OUTRIGGERS—PADDLES.

Invention of the Sail—The most primitive form of sail—Subjection of the Earth—The Outrigger—Ice-yachts—Outrigger under sail—Canoes of New Guinea—The Double canoe of Fiji—The art of shipbuilding—Shipbuilding without nails or bolts—Ease of repair—The captain's cabin—Little Venice—Humboldt's account—Paddles—The paddle-wood tree—Paddles of Guiana and Vancouver's Island—Kingsmill Island Paddles—Their intricate carving—The Dancing paddle—Primitive tools used by the carvers—Flint and stone saws—The backed Saw—Australian Saw—Flint Drills.

WE will now imagine ourselves in the Pacific Ocean, and passing among the groups of inter-tropical islands, such as the Sandwich Islands, north of the equator, and the Marquesan, Samoan, Society, Friendly, Fijian, and New Caledonian groups on the south.

Here we find ourselves faced with two totally new developments in the art of boat-building. All the vessels which have hitherto been mentioned have been propelled by human strength. Man, however, need not waste his powers upon paddles or oars when he could propel his boat by other means, and so set his hands free for more useful purposes. The first labour-saving invention in this direction is the SAIL,

by means of which man takes another step in his mission of subduing the world, and makes one of the powers of Nature his servant instead of his master.

The most primitive sail in existence is that which is used by the North-American Indians in their canoe races. Although the canoes are propelled by paddles, it is held legitimate for the captain of each boat to stand erect in the bow, take off his robe, hold one end under his feet, and spread the other as widely as he can with extended arms. The robe, therefore, becomes a sail, while the man's body does duty for the mast, and when the wind is fair this simple sail affords a great assistance to the rowers.

The second invention is the outrigger, *i.e.*, a sort of secondary boat attached to the side of the principal canoe by horizontal bars. As the Fijians are the most renowned boat-builders of the Pacific, I have chosen one or two of their canoes as examples of the art.

The illustration on page 390 shows an ordinary outrigger boat in full sail, and, even to the most casual glance, the distinction between the canoes of the Pacific and those of the rest of the world is boldly marked.

In this specimen the canoe proper occupies the front of the illustration, while the outrigger is lying parallel to it, and connected by long spars to the canoe. These spars answer another purpose, acting as a sort of bridge, by which the occupants of the canoe can make their way to the outrigger. When the wind is very high, and threatens to upset the

vessel, nearly all the crew will run out to the outrigger and rest their weight on it.

Outrigger under Sail.

In the winter of the present year (1885), I saw a number of ice-yachts sailing on Lake Ontario, and was

much struck with the resemblance of these remarkable craft to the outrigger canoes of the Pacific, the crew being clustered on the windward runner, holding to the rigging with one hand, and leaning outwards as far as they could.

The plan on page 392, which shows the appearance of the canoe as seen from above, will explain the construction of the vessel.

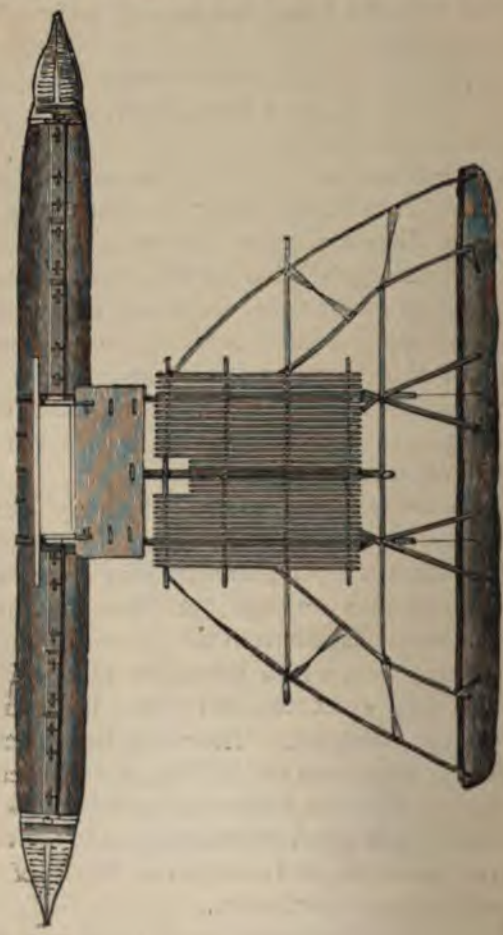
The canoe is, as the reader may see, exactly alike at each end. These craft never "go about," but can sail in either direction merely by swinging the sail round, and shifting the clew to the opposite end of the canoe. The mast is very short, and in the opposite figure is hidden behind the sail, which is made of a sort of thin matting, while the place of the "leaches" is taken by two long bamboos, which unite at the clew and then diverge, so as to give the sail a sort of shield-like form.

The apparently complicated but really simple arrangement of bamboos, by which the outrigger is connected with the spar platform, may be seen by reference to the plan on page 392, while its appearance in perspective is shown in the figure.

The steering oar, which takes the place of our rudder, is of very great size, and passes between the canoe and the outrigger. There are two of these steering oars, one at each end, so that, when the canoe changes her course, the steersman merely ships the oar at which he has been standing, goes to the other end of the platform, and drops the blade of the second steering oar into the sea.

In a large canoe these oars are as much as twenty

feet in length, and need several men to hold them. Even with the assistance of steering tackle, the strain on the oar is so great in a stiff breeze that more than



Plan of Outrigger.

once a steersman has been killed by a sudden blow from the handle.

The Pacific Islanders have been so accustomed to see all sailing-vessels fitted with outriggers, that, when British ships first visited their shores, the possibility of a vessel being able to sail without outriggers was at first disbelieved, and was then attributed to the magical powers possessed by the strange white-skinned visitors.

Several examples of the outrigger are shown in the illustration on next page. In the large canoe, the mast is lowered and the large sail of palm-leaf matting is rolled up and lying on the platform. The crew, having nothing to do, are scattered indiscriminately upon the canoe and outrigger, leaving only one man to keep way on the vessel with his paddle.

The reader will notice the manner in which the ends of the connecting spars are carved into the form of birds' heads and necks.

In the distance are two canoes under full sail. The sail of the left-hand canoe is like that which has already been described, while that on the right is of a totally different form, presenting a curious resemblance to the Zulu shields which have been figured on pages 303, 304, 307.

The canoe in the foreground deserves a short notice. It is one of the numerous make-shift devices which are called catamarans. It consists merely of three boards, two of which are placed on their edges, and set at an angle with each other. The third plank is fastened upon their upper edges, and forms

Canoes of New Guinea.

a deck, so that a section of the canoe would have this ▽ appearance.

There is not even an attempt at a gunwale, but the boatman kneels on the deck as shown in the illustration, and propels the little vessel with wonderful speed. As the sea continually washes over the deck, the boat-maker fixes a rude table upon it, so that any goods that could be injured by sea-water may be covered with waterproof wrappers and tied upon the little table.

By far the best example of the tropical Pacific boats is the great double canoe of Fiji, one of which is represented on page 396 as it appears under full sail.

In this vessel—for it well deserves the name—there is no separate outrigger, but two large canoes are placed parallel to each other, and connected by a wide deck, as is here seen, so that one of them always answers instead of an outrigger.

The sailing arrangements are much the same as those which have been described. The mast, however, is not removable, but works in a pivot at the foot, so that it can be lowered over either end at will, much like the masts of our Thames sailing-barges. When the vessel is under sail, the mast always leans away from the bow, just as we prefer the masts in our sailing-vessels to rake a little aft.

As may be seen by the illustration, the vessel is going in the direction in which the captain is pointing, the spray flying from her double bows. Two men are at the steering oar, but the wind is so high that two more are coming to their assistance.

In these canoes we find regular hatches cut through

Fijian Canoe in a Breeze.

[redacted]

the deck, so as to give access to the interior of the vessels, which are, moreover, furnished with decks of their own in order to prevent the entrance of water. Consequently, although the Fijians, not having the compass or sextant, cannot sail to any great distance from land, they can withstand very severe weather without the danger of having their vessels swamped.

Another point must be mentioned in connexion with these large vessels. All the canoes which we have as yet seen are of simple construction, and of two kinds. One set are made on the "dug-out" principle, such as Robinson Crusoe employed, where the canoe is simply the hollowed trunk of a tree more or less elaborated. The second set are made of the bark of trees, or the hides of animals, mostly stitched over a skeleton, or framework.

The Fijians, however, are far advanced in the art of ship-building—*i.e.*, of making the hull of a vessel out of a number of separate pieces.

No nails, bolts, or similar appliances, are used, all the parts of the vessel being merely lashed together with cocoa-nut-fibre cords, and yet the junctions are so strong and so neatly made that no caulking is necessary,—a feat which our modern shipwrights would consider impossible. It would be impracticable, without the aid of working drawings, to explain fully the singularly ingenious system which is employed by these savage boat-builders.

When the planks are dubbed down to the required thickness, a bold rib or flange is retained along the inner edge. This flange is bored with a row of holes precisely the same distance apart, so that, when two

planks are set edge to edge, the holes exactly coincide with each other.

When the planks are prepared, their edges are covered with a light-coloured pitch, which is laid on a strip of thin bark-cloth. The planks being in their places, a burning stick is pushed through the holes so as to clear them out. The planks are then lashed, or rather sewn, together by the flat fibre-strings, which are repeatedly passed through the holes, being hauled taut each time, until the hole is too full to allow the string to pass through it. A wooden peg is then driven into the hole so as to secure the strings, and then the end of the peg and the projecting strings are cut away.

The reader will see that all the lashing is done on the inside, and if, during a gale, the strain on the planks causes any of the lashings to give way, nothing is easier than to knock out the wooden peg, clear away the strings, and lash it afresh.

When the hull is completed as far as the interior goes, the outside is trimmed into shape with the adze, and rubbed smooth with pumice-stone. So neatly and firmly are the junctions made, that from the outside the vessel looks as if it were cut out of a single piece of timber, the seams being hardly perceptible.

Some of the Fijian boat-builders are widely celebrated for the perfection of their work, and amass great fortunes by selling their boats to other islands.

The reader will probably have noticed that there is a deck-house on board the double canoe. This is

the captain's cabin, and the roof answers the same purpose as the "bridge" of our steamers. It is scarcely necessary to mention that the designers of the double steamer, the *Calais-Douvres*, borrowed the idea from the double canoe of Fiji.

HAVING now glanced at some of the best-marked types of boats and canoes, we will examine a few of the Paddles by which they are propelled. In several parts of South America there are great lakes which are inhabited by people who live exactly as did the lake dwellers of Switzerland in the pre-historic times of the stone period. The Swiss lake-dwellers, however, built their houses on piles artificially driven into the bed of the lake, while the habitations of the South American lakes have their floors and roofs—they have no walls—fastened to the stems of the Ita palm (*Mauritia flexuosa*), sometimes called the Moriche, which grows in such profusion that scarcely any one except a native can find his way among them.

This palm is indeed the staff of life to the inhabitants. To the still growing stems are attached the floors and roofs of their houses, as shown in the next illustration. Smaller stems, when felled, are used as beams and joists; and, indeed, there is scarcely a necessity of life which it does not furnish. In his "Personal Narrative," Humboldt gives a most vivid description of this tree, from which I extract the following passage:—

"It not only affords the Guarons (*i.e.*, the Wara

The Lake Dwellers of the Orinoco.

[redacted]

a safe dwelling during the risings of the Orinoco"—as represented in the illustration—" but its shelly fruit, its farinaceous pith, its juice abounding in saccharine matter, and the fibres of its petioles, furnish them with food, wine, and thread proper for making cords and weaving hammock. . . .

"It is curious to observe in the lowest degree of human civilisation the existence of a whole tribe depending on one single species of palm-tree, similar to those insects which feed on one and the same flower, or on one and the same part of a plant."

The name of Venezuela, or "Little Venice," was aptly given by the Spaniards to this cluster of villages, and the title has been gradually extended to the whole of the province.

Canoes, therefore, such as are figured on page 400, are absolutely necessary to these lake-dwellers, and the paddles which are employed by the boatmen are always made on the same model, however much they may vary in unimportant details.

They are constructed from the Yarari, or Massara (*Aspidospermum excelsum*), a most remarkable tree, which really looks as if its only object were the manufacture of paddles. Indeed, the colonists universally term it the paddle-wood tree.

The reader may remember that the wild cotton-tree sends out from its trunk a number of flat buttresses. But the paddle-wood tree has so many and so thin buttresses that there is some difficulty, when the tree is growing, in finding the trunk, or distinguishing it from one of the buttresses, or "flutes," as they are generally called.

In the singularly interesting and valuable Technological Gallery at the Crystal Palace there are some specimens of the paddle-wood tree as it appears when growing, a section, and some of the paddles themselves. It grows to a height of sixty or seventy feet, and its diameter is, as far as so oddly-shaped a tree can be said to have a diameter, about five feet.

Guianan Paddle.

While growing, the wood is exceedingly soft, so that with a few blows of his machete, or cutlass, the native boatman splits a "flute" from a tree and cuts it into the form that is here shown. When the wood is dry, it is wonderfully light, elastic, and strong. When it is quite dry, the women colour it in very rude and imperfect patterns, using red and black as the chief colours.

If the reader will refer to page 382, he will see a representation of a canoe from British Columbia. The paddle with which this form of canoe is propelled is a great improvement in every way on that of the Guianans.

It preserves nearly the same form, retaining the cross-shaped end of the handle and the elongated blade. I have mentioned that the paddlewood is, when dry, exceedingly light

and strong. The former quality is shown by the fact that, although the specimen from which the drawing was made is four feet six inches in length and six inches wide in the blade, it only weighs one pound and two ounces. The second quality is shown by inspection of the blade, which is so thin, that when used it bends and springs against the water as if it were made of whalebone.

As with the Guianan paddle, the ornament is left to the women, who adorn it with very bold and striking patterns, always of one character. I have no doubt that this pattern is a conventional representation of the human face, the eye and mouth being greatly elongated. Some of the dancing masks which they carve out of a light wood are of a similar character, and so are the elaborate pipes which they carve out of a kind of slate.

The boatmen are singularly expert and daring. They will load their canoes with fish within an inch or so of the water's edge, and then, instead of going on shore, unloading, and returning for more fish, they will fasten all their spare floats round the gunwale, and go on with their sport.

Paddle : British Columbia.

They have no hesitation in venturing some distance to sea, especially if whales are seen, and there is any hope of driving them into shallow water where they will be stranded when the tide recedes. Even the large waves have few terrors for them, and, when a wave is rolling in-board and cannot be evaded, they have a way of cutting it with the edge of the paddles, so that most of it flies harmlessly over the boat.

AGAIN passing to the tropical Pacific islands, we come on a form of paddle quite as distinct as the outrigger canoe.

All paddles must agree in having a wide, flat blade and a handle by which it can be worked; but the shape of paddles belonging to different countries is so well marked that an expert can always refer a paddle to its own country, even though it be of a form that he has never seen before. If the reader will refer to the figure of the Eskimo in his kayak, he will see that the paddle is double-bladed, such as is used in our own canoes of the Rob Roy class.

The Guianan and British Columbian paddles are adorned with paint, but those of the Pacific islanders are often covered with the most elaborately-carved and often artistic designs. Both the paddles which are here figured are from the Kingsmill Islands, and, together with the shark-tooth sword and spear, formed part of my collection.

Although a smaller implement, and not so pro-

fusely adorned as many specimens, the paddle which is here figured is, as a work of art, the best example that I have seen. It is made of a very dark brown and hard wood, which takes a peculiar satiny gloss when polished, and its shape is singu-

Kingsmill Island Paddle (1).

larly graceful. As may be seen from the section given above, the blade is slightly hollowed, so that it looks like a very shallow spoon.

In the adornment of the blade the artist has restricted himself to stars, one of which is shown of its full size, so as to give an idea of the extra-

ordinary pains which have been taken by the carver. The whole of the handle is carved with designs much resembling those of the ornamental adze which is described on page 169, and the design changes at every two inches.

The end of the handle is formed into a coronet-like form, surrounded with a row of shields, upon each "chief" of which the starry ornaments which decorate the blade reappear, so that the artist had evidently worked out his design before he began to carve the paddle. The length of this paddle is about four feet.

The second Kingsmill Island paddle is a larger implement than the former, and, although loaded with decorations, is quite devoid of the harmonious grace which pervades its companion.

The handle is squared, as is the extremity, and, although it is covered with elaborate carving, there is no variety in the pattern. The blade is also profusely adorned with carving, but there is no unity of design in it as in the other specimen. Moreover, the wood is of a different character, dull brown in colour, and without any polish.

A very small paddle, varying from eighteen inches to two feet in length, is also made. It is not intended for use in a boat, but is carried in the hand during the wild dances in which the heart of a savage rejoices, being flourished about in time with the yells, leaps, and stamps which these people are pleased to call dancing.

Considering that the only engraving-tool which the artist could have used was a splinter of flint

ck in a piece of wood, the freedom and truth the cutting and the beauty of design are abso- ely wonderful.

Kingsmill Island Paddle (2).

IERE I must make casual mention of one or two other rimitive implements which in early days must have

en used in the production of these specimens of tive art.

The advantage which a notched edge enjoyed over smooth one did not escape the workers of the

Flint Saw.

earliest stone ages. Here is an example of a flint-flake which has been regularly notched along the edge so as to convert it into a saw.

I rather fancy that the longest and most perfect flakes were reserved for this purpose after they had lost the smooth edge which gave them their value

Flint and Stag-horn Saw.

as knives. As has already been mentioned, the flakes could be procured so easily and in such numbers, that when blunted they were thrown away and others made. But, if the blunted knives were too good to be thrown away, and their edges too

much damaged to be useful again as knives, nothing was easier than to notch the edge, as Falstaff hacked his sword, and so convert it into a saw.

That such exceptional pieces of flint were much valued is shown by the accompanying illustration of a saw belonging to the flint ages. Here the saw-maker has been so careful of the flint-flake, that he has let the back into a stout piece of deer-horn, just as at the present day we strengthen the thin blade of our "tenon-saw" with a thick backing of brass. There is nothing new under the sun.

In the same epoch, flint was not the only material of which saws were made.

Stone Saw.

Flints are but of limited dimensions, so that no saw made of this material could be more than a few inches in length. Stone, however, if sufficiently hard, would answer the desired purpose, and therefore we find that stone saws were made of nearly the same form as those of flint, but of much larger dimensions.

Yet another method remains for those races who have not passed beyond the age of flint. The necessity for a saw was paramount, and neither flint nor stone could be found which was of sufficient size

for the purpose. But, if it were possible to fix a number of small pointed fragments of flint, or other cutting, material along a handle of wood or bone, the same object would be attained.

An example of such a saw is here given, and although, when the instrument came into my possession, it had suffered much from neglect and rough treatment, it was yet a very effective cutting tool.

Many larger saws are made, but the length of this specimen was just fourteen inches. A narrow groove is cut along the thicker end of the handle, and in this groove are set a number of small flakes of obsidian, and fastened by means of the black-boy gum which

Australian Saw.

has already been mentioned. The groove was first filled with the gum, which was softened by heat. The obsidian flakes were then pressed into it, and more gum added until the teeth were imbedded for fully half their depth.

As is often the case with the weapons and implements of savages, the saw can be used for more than one purpose—"contrived a double debt to pay." The handle is made of very strong wood, and, when the end is sharpened to a point, it can do duty as a

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"wappoo," and help the owner to ascend trees (see page 25).

If we compare these primitive saws with those of the present day, we shall see that, throughout the long procession of ages which divide the man of the palæolithic ages from the nineteenth century, the saw in one form or other has been in use, made by man to assist him in perfecting his handiwork, and that, although the tool may vary in detail according to the material of which it is formed, the principle has remained unchanged.

The same remarks will apply to the boring instru-

Cross-cut Saw.

ments. The eyes of bone and deer-horn needles were bored by means of drills, almost identical with the fire-drills which will be described in the next chapter. Indeed, I have little doubt that the drills which are employed for the purpose of making fire were originally intended for the purpose of boring holes, and that the large amount of heat which was evolved in the process gave the operator the notion that a similar instrument might, if properly handled, evolve sufficient heat to produce fire.

Even with the apparently modern instruments, the "brace and bits," the gimlet, and the bradawl, we

find the same principle of the revolving point carried out in different ways; and it is a remarkable fact that several of the "bits" are almost copies in steel of

Brace and Bit.

Gimlet.

the wooden hand-drill by which the New Zealander of the present day bores a hole through the handle of his stone merai.

CHAPTER XXVII.

FIRE.

Man and Fire—Monkeys and fire—Production of fire—Friction of wood against wood—Vesta's sacred fire—Kafir fire-maker—Fire-making in Australia—The Fire-drill—The Bow and the Spindle-drills—The "bandalore"—Flint and Steel — Tinder-making—The Phosphorus bottle — The Vitriol match—The Birmingham coach—The original Lucifer—How the tinder-box is used—A cold winter night and frozen fingers—The Pistol tinder-box—The Wheel-lock fire-arm—The Flint-gun.

WAS there ever a time when man was without the knowledge of Fire? I think not.

Was there ever a time when any living creature except man could produce fire, or make use of it when produced? I am sure not.

The former query we can never answer, but there is no difficulty in answering the second. Even putting aside the power of producing fire, where is the animal that ever used it? Excluding all animals except the quadrumana, as being, for want of hands, physically incapable of using fire, where is the monkey, baboon, or ape that has ever done so?

They have not failed for want of opportunities o learning, for even the great anthropoid apes, the gorilla, the chimpanzee, and the orang-outang must

have seen fires which had been lighted by man, while many of them have had the opportunity of visiting the fires which man had abandoned, so that if the remotest capability of fire-making existed in them, they might have taken advantage of it.

But, although it has been said, on rather doubtful authority, that when monkeys find a fire that has been deserted by man they will sit round it and hold their hands to it until it has burned away and the ashes have become cold, no one has dared to assert that a monkey ever kept such a fire alight by throwing fuel on it, though plenty of dry sticks might be found lying about, and the monkeys had only to imitate the actions of the men whom they had watched.

HOW was fire first produced?

There can be but little doubt that friction of one piece of dry wood with another was the original means of procuring fire. I have already mentioned that primitive customs often survive in religious ceremonies long after they have been superseded in common life by more convenient substitutes, and gave, as one of the instances, the uses of the flint knife among the Jews long after knives of metal were in their possession.

Another example will be familiar to my classical readers in the sacred fire which the Vestal Virgins were bound to keep incessantly burning. If the priestess in charge fell asleep during her watch and allowed the flame to expire, she had to undergo heavy penalties, and the fire was re-kindled, with

many ceremonies, by the friction of one piece of wood against another.

In every uncivilised part of the world this mode of fire-raising has been in vogue from time immemorial, and a very useful custom it is, as, where two dry sticks can be procured, a fire can always be raised.

Two modes of fire-making by friction are nearly universal.

The first is that which is represented in the illustration on page 416, and which may be seen any day in South Africa. The operator lays one stick on the ground, and holds it down with his feet, while he places the pointed end of the other stick upon it. This second stick is mostly of harder wood than the first. He then twirls the upright stick between his palms, pressing it slightly downwards, and in a short time he works a small conical hole.

Presently, the sides of the hole begin to darken, and a quantity of fine dust falls into it. By the continuous friction so much heat is evolved that the sides of the hole become black, the dust becomes red hot, and, when blown upon, bursts into an evanescent flame. A little fine and very dry grass is then carefully laid upon it, and the blowing continued until the grass takes fire. It is then covered with small dry sticks, and those again with larger, until a good fire is made.

As the stick is twirled, the hands work themselves down to the end. But, if the operator were to wait but for a moment in order to shift his hands to the top of the stick, all his previous labour would be in vain. He, therefore, always has a comrade who sits

married man, known

Zul

which proclaims his ra
little bundle of dry gra
will place on the fire-s
coax into a blaze with

[redacted]

ready to take up the twirling when his help is needed.

The Australians employ this plan of fire-raising, and both in that country and in Kafir-land plenty of old fire-sticks are to be seen lying about in any place where the natives have made a stay.

Owing, however, to the hard work of fire-raising, the duty of keeping the fire always lighted is committed, as among the Romans, to the women, and, when the party leave their encampment, the women take care to wrap burning brands in many layers of dry bark, so that the fire may smoulder, and be in readiness when they halt again.

This is, in fact, analogous to the "gathering peat" of Scotland, where the still burning embers are covered with ashes and peat well pressed down, so as only to admit enough air to keep the embers from actually expiring.

Sometimes in Australia, if these smouldering brands should go out, the women who have been careless enough to permit such a loss to occur are obliged to beg fire elsewhere before the men discover the loss. Otherwise they would be in as bad case as the neglectful Vestal virgins. I do not know whether a white man ever produced fire by unaided friction, and the task is so difficult, that even in Australia some tribes have never learned, or have forgotten the art by long disuse, and are obliged, if their own fire should go out, to beg from some other tribe.

The other mode of friction is by rubbing the pointed stick backwards and forwards, so as to make a groove about three or four inches in length. The

work is even harder than that of the twirled stick, and the operator is always breathless and dripping with perspiration before the fire is fairly produced.

Now we come to a plan whereby the twirled stick is still used, but with the aid of artificial appliances which lessen the labour and enable a single person, even a child or a woman, to make fire with very little fatigue.

The appliance in question is what we now call by the name of the "bow-drill."

This has been used from time immemorial among the Eskimos, and if, as is likely, they are the descendants of the pre-historic Cave Dwellers, its use must have extended to unknown antiquity.

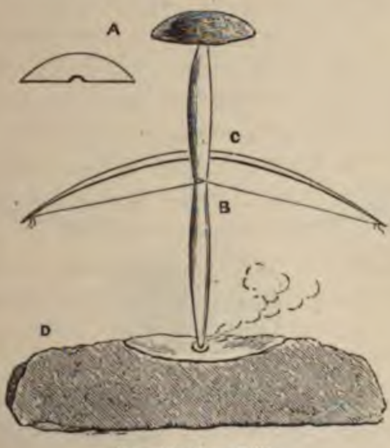
The principle of the bow-drill is simple enough, but is so effective that we of the present day use it exactly as it was used by our predecessors. Whether it was first used as a drill, and then, on account of the heat produced by its friction, was utilised as a fire-maker, or whether these operations were reversed, is open to conjecture.

My earliest recollections are connected with the beautiful Eskimo bow-drills which are to be seen in the Ashmolean Museum, Oxford, and I have on that account always cherished a kindly feeling for the instrument. These bows must have been highly prized by their owners, as they are covered with engraved drawings of hunting scenes, animals, &c., curiously like those of their reputed ancestors.

Fire-drills of a similar character are still in use among the North American Indians, two forms of which are figured, pages 419 and 420.

The first is that which is employed by the Dacotahs, and is exactly similar to the ordinary bow-drill of our own country.

The handle, A, is either of bone or hard wood, the former being preferable. It is nearly hemispherical, and in the centre of the flat lower surface there is a little conical socket in which the upper end of the firestick, B, revolves. A section of the handle is shown on the left.

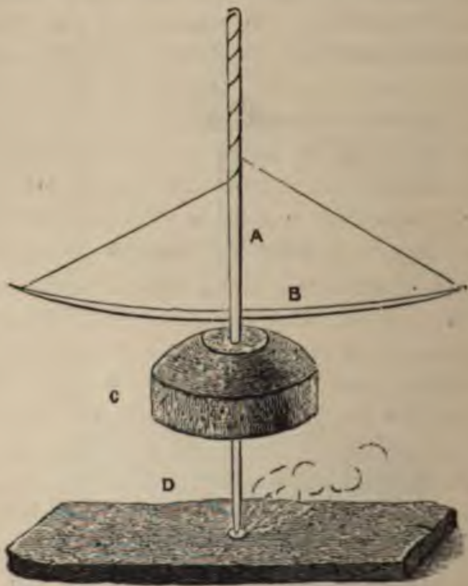


Dacotah Fire-drill.

C is a slight bow—strength is not needed in this instrument—and, when used, the string is twisted with one turn round the middle of the fire-stick, which is narrowed for its reception. This thinning of the fire-stick has two objects. In the first place, it keeps the string in its place; and, in the next, it gives greater rapidity to the movement.

D is a piece of very dry and rather soft wood, the

fire-stick itself being of a harder grain. One man can easily produce fire by means of this drill. He can fix the dry wood, D, by placing his feet upon the ends while he is seated, having previously prepared it by slightly flattening the upper surface, and scooping a little round hole for the reception of the fire-



Iroquois Fire-drill, two-thirds wound up.

stick. He then twists the bow-string round the middle of the fire-stick, sets the latter upright in the hole, fits the socket into the handle, and then leans on the handle with his chest, thus leaving both hands at liberty.

With one hand he draws the bow from side to side, thus causing the fire-stick to revolve with a rapidity far exceeding that which can be obtained by the hands alone. With the left hand he keeps scraping the fine wood-dust into the hole, and when he sees smoke rising, as in the illustration, he gathers dry grass over it until it is well heated, and then by his breath blows it into a flame.

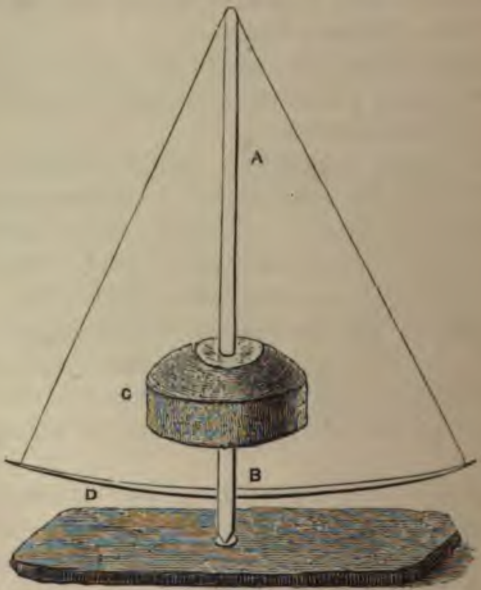
In skilful hands the operation is a very rapid one, occupying only a minute or so, and demanding very little physical exertion.

The second fire-drill is really startling, being identical with the spindle-drill of our own country.

Although a bow is also employed in this form of drill, it is not used in the same manner. The handle is not absolutely necessary, though it gives greater steadiness to the instrument. The string of the bow passes through a hole in the upper part of the fire-stick, or spindle, and the two ends are then attached to the bow, so as to leave the string quite loose.

Near the lower extremity of the spindle is fixed the spindle-weight, or whorl, which is always of heavy material and generally cut out of stone. A piece of soft, dry wood is prepared much as is done by the Dacotah Indians. The right hand holding the bar loosely, while the spindle is set upright in the socket prepared for it, the spindle is spun round until it winds up the string, as seen in the illustration. Now, if the bow, still held horizontally, be moved downward, the spindle revolves rapidly until the string is straightened, as shown in the second figure.

Here it would stop if not weighted. But the hea
whorl continues to rotate, and winds up the stri
afresh in the opposite direction, when the bow c
again be drawn down. Some little practice is
quired in this operation, as it is necessary to "humou
the spindle-whorl, by allowing the bow to be rais



Iroquois Fire-drill, unwound.

when the cord is wound up, but yet exercising suffi-
cient pressure to keep the string just tight enough to
prevent it from bagging. In fact, the self-winding
principle is exactly that of the well-known toy called
the "bandalore" or the "water-cutter," made by boys

from a disc of tin and a piece of string. Even a tolerably heavy metal button can be worked in the same fashion.

FRICTION is, as we have all been taught by mechanics, a succession of blows or strokes, the number depending on the material. Thus, when a match is drawn across an inch of sand-paper, it strikes a blow on each grain of sand, the number of blows depending on the number of sand-grains, or, in other words, on the coarseness or fineness of the sand-paper.

Similarly, if we strike a violin string we produce a sound answering to the tightness with which the string is stretched. If a practised violin-player draws his bow across the same string, he produces the same note, but of a different quality. In fact, the little grains of resin with which the hairs of the bow are imbued strike separate blows upon the string, the mode of handling the bow, or "bowing," as it is technically named, producing that apparently continuous vibration which we call a "tone."

Now, when we see sparks struck from a stony road by the feet of a shod horse, we may be sure that the process is exactly the same as that which produces fire by the friction of two sticks against each other, the only difference being that in the former case the fire is produced by one severe blow, and in the latter by a rapid succession of slight blows.

Perhaps some of my readers are old enough to remember the old domestic institution called a Tinder-box, such as is represented on the next page. I

cannot but think, however, that the artist who drew the figure had never used the apparatus, as otherwise he would not have allowed the cover to remain upon the tinder while the flint and steel were being used.

Nowadays, we hardly know the meaning of tinder, and, although the word is constantly used in a meta-

Flint and Steel. Tinder-box and Matches.

phorical sense, there are few of the writers who ever saw tinder set alight by sparks.

Tinder is composed of linen rag nearly, but not quite, charred. Old linen rags were always converted into tinder when they were too much worn to be used for any other purposes.

Perhaps the reader of "David Copperfield" may remember that after he had run away from blacking-bottles, and had found a refuge with his aunt, he perceived a strong smell as of something burning; and, on asking its cause, was told that the cook was making tinder out of his shirt.

Readers of the present generation can hardly realise the force of the passage, but to those who have passed the ten (or by'r Lady twelve) lustres so deplored by Horace, no expression could more forcibly have pictured the absolute dilapidation of the garment in question.

As long as the fabric of linen rag would hold together it was utilised for other purposes, and not until it was utterly past all use was it consigned to the tinder-box. Indeed, there used to be a perpetual skirmishing on this subject between the cook and the other female inhabitants of the house, the one always on the alert to lay hands on every piece of linen rag that she could find, and the others trying to save it from her clutches.

I wonder what she would have done in these days, when linen is so little used, and cotton, which does not answer for tinder, has taken its place.

In the days of my childhood there was no other means of obtaining a light than the tinder-box. Night-lights were not then in existence; so that, if any one were obliged to get up in the night, the tinder-box was the only resort. My father, being a medical man, used generally to be called up once in the night, and as I, being a weakling, had to sleep in the same room, I had plenty of tinder-box experience.

The first approach to the matches of the present day was a bottle containing some phosphoric preparation. The matches were pushed into the bottle and stirred about, and when withdrawn they were alight. This phosphoric bottle is mentioned in David Copperfield's school-days, Steerforth being the owner of the wonderful bottle.

Then there came matches, about four inches long, with long, pear-shaped ends.

You took a penny, laid the match on its face, and then, with the edge of another penny, smashed the end of the match, which burst into flame. The fact is, there was in the middle of the pear a tiny capsule, containing one drop of vitriol, *i.e.*, sulphuric acid, while the surrounding space was filled with a mixture of chlorate of potash and pounded sugar. Pennies *were* pennies in those days, and a blow from the edge of one of those massive (and greasy) coins would have damaged your thumb if you happened to hit it instead of the match. Some of these matches may be seen in the Technological Gallery of the Crystal Palace.

These matches were first shown to me on the outside of the Birmingham and Derby coach, which used to start from the then celebrated Hen and Chickens, now an hotel no longer. The exhibitor was a Derbyshire man, who was engaged in a controversy with a fellow-passenger from the same county as to the respective virtues of buckles and ties when applied to shoes. He was entirely in favour of the former, and summed up his argument with the axiom that "when a shoe is boockled it's boockled." His opponent,

retorting with "And, when it's teed, it's teed," rather discomposed him. But, he produced the percussion-match, exhibited its powers, and annihilated his antagonist. If any one on that Derby coach had dared to assert that, while lying in bed in the dark at Derby, a child could flood with light every street and house in Birmingham, and set all the fires in full blaze, by pressing a little ivory stud at his bedside, he would very soon have found himself inside a lunatic asylum.

After this, there came—I think at the beginning of 1840—the Lucifer Match.

Twelve matches were carefully packed, with saw-dust, in a stout wooden box, and enclosed was a piece of sand-paper. This you doubled, seized the edge of the match between the folds, jerked the match through the paper, and so lighted it. This was thought a wonderful invention, but was held by old-fashioned people to be too dangerous ever to supersede the good old tinder-box.

Assuming that few of my readers are practically acquainted with the art of "striking light," as it was called, I will first describe the apparatus.

The steel was mostly made of the shape as represented on page 424, and the flint was, if possible, the same which was used in guns. Indeed, as Oxford, where my childhood was passed, is not on a flint-producing soil, I never saw a complete flint until I was eight or nine years old, when, to my great delight, I picked up a broken flint at Henley, and cherished it as a priceless possession.

Next came the tinder.

If the reader will look at the illustration referred

to, he will see that the box was a shallow circular vessel. In it is a handle. This belongs to the "cover," a flat iron plate, which was laid on the tinder for the double purpose of putting it out when lighted, and of keeping it from being blown away. To make the tinder, you set fire to a piece of linen-rag, laid it in the box, and then quenched it by putting the cover on it. Those parts that had not burned were again lighted, until the rag was all reduced to tinder. Of course, there was much escape of smoke, and hence the "smell of burning" to which David Copperfield drew attention.

Next came the matches. These were thin, flat strips, pointed at each end, and with the tips dipped in melted sulphur. "Bundles of matches" were usually purchased at the door from itinerant match-sellers, who had a peculiar cry of their own.

When you wanted to light a candle at night, you had first to find the tinder-box in the dark. Then you had to secure the steel in one hand and a flint in the other, and then to remove the cover and lay the matches on the table. You had to be careful that there was no draught, as the least wind would blow the tinder out of the box.

Then, holding your hands over the box, you had to go on chip-chipping at the steel in the dark, holding the flint cross-wise and not edge-wise, as in the illustration. Sometimes you hit the steel, sometimes you hit your knuckles, and sometimes you hit nothing, especially on a cold winter's night, when your fingers were so frozen that you hardly knew whether or not anything was between them.

At last a spark would fall into the tinder, and then you had to blow it until there was a patch of tinder alight about as large as a sixpence. Then the end of the match was applied to the tinder and well blown, while its suffocating fumes half choked you and filled the room with the vapour. When the little blue flame was at last evoked, the match had to be sheltered from all draughts, until the wood at last burst into flame and allowed the candle to be lighted.

People of very luxurious habis provided them-

Pistol Tinder-box.

selves with a pistol tinder-box, one of which curious implements is now before me, a relic of old times.

It consists of a pistol-stock without the barrel. The hammer is, of course, fitted with the flint, the instrument having being made at least fifty years before the invention of the percussion-cap. Instead of the shallow pan, which held the priming-powder, there is a square receptacle for tinder, and along the side of the stock there is an oblong chamber, closing with a spring, for the reception of the little matches which were made expressly for the purpose.

The illustration is drawn from my specimen, the total length of which is ten inches. At a little distance it looks so like an old-fashioned pistol that I do not wonder at burglars being repulsed when the master of the house presented a tinder-box at them. I had seen this fact mentioned in a very old periodical, but, until I saw these implements, could not understand how any one could be frightened by a tinder-box.

The "wheel-lock," of Elizabeth's day, which preceded the flint, was a very cumbrous piece of mechanism. A cylindrical mass of iron pyrites was attached to a strong spring, and wound up by a handle, and fastened by a catch. When the trigger was pulled, the catch was released, and the wheel revolved rapidly against the steel, sending forth a shower of sparks, one of which would probably fall among the priming-powder and fire it.

CHAPTER XXVIII.

THE FURNACE AND FORGE.

Metal-working—Metal ores and their reduction—Difficulty in obtaining heat—Why the Bronze age preceded that of Iron—Bronze castings—The Bosjesman as an iron-worker—Welding iron—The Egyptian smelter and his crucible—The Blast-furnace of the present day—The Saxon Blacksmith—The smith's tools—The anvil, and hammer and tongs—Pre-historic tongs—Central African tongs—The Pincers — Quentin Matsys' Iron Fountain—The Helve-hammer—The Trip-hammer—The Nasmyth hammer—Shovel-making in America.

BEFORE passing to another branch of our subject, we must glance at the process by which metal is obtained from the ore. As my readers are probably aware, few metals are found in a pure state, and that such metals are in very small quantities. We will only take one metal for consideration, namely, iron, and will see how it is obtained.

In certain localities, iron ore exists in vast quantities; but, until the iron can be extracted from the large quantity of other materials with which it is mixed, it is useless to man. At present, no other mode of extracting the ore has been discovered, save the application of intense heat.

This fact supplies the reason why the Bronze age

preceded that of iron. The two metals—*i.e.*, copper and tin—which, when mixed in certain quantities, produce bronze, are, separately and conjointly, fusible at a much less temperature than is required for iron. It follows, therefore, that, although a people may be able to produce a heat which will fuse either copper or tin, and can produce weapons and utensils by casting them in moulds, iron is as far beyond their reach as bronze was beyond the reach of their predecessors of the Stone ages.

Even at the present day we find that the Bosjesman, although he is anxious to possess little scraps of iron wherewith to arm his arrows, has not even the power of softening the metal by heat, but slowly beats and grinds it into shape when cold.

Other tribes, of higher rank in civilisation, can heat iron red-hot and hammer it into shape, but cannot obtain a white heat, such as is necessary for welding it.

Thus it has more than once happened that English travellers have found certain iron-working tribes to be more impressed by the tires of the wagon-wheels than by any other product of civilisation. They expected to find a place where the two ends of the iron tire were joined, and looked upon the continuous tire as a veritable miracle.

Their wonder was excited even to a higher degree by seeing the mysterious strangers take several pieces of iron and weld them together into one. At the present time, when iron is used in such vast and massive pieces, it is difficult to realise the condition of a people who do not need more than a pound of

metal at a time, or, in very extraordinary cases, about two pounds.

Such seems to have been the case with the ancient Egyptians, among whom metal was sparingly used, and in very small masses. If the reader will compare the figure of the Egyptian smelter, who fused the ore more than three thousand years ago, with the Kafir iron-worker of the present day, he will see that they are much on the same level. Yet the Kafir is

Egyptian Smelter.

only a semi-savage, while several other tribes who are far better iron-workers than the Kafirs, are, as we have already seen, absolute savages, cannibals by preference, and wearing no clothes.

Whereas the Egyptians were at the head of existing civilisation, and possessed art which we of the present time cannot equal. Their architecture is still, though in ruins, a wonder to all ages. Our best-

tempered steel can make but little impression upon the granite which they contrived to work as if it were mere wax. To be "brought up in all the learning of the Egyptians," as is said of Moses in Acts vii. 22, signified that he was among the wisest and most learned men of all the world.

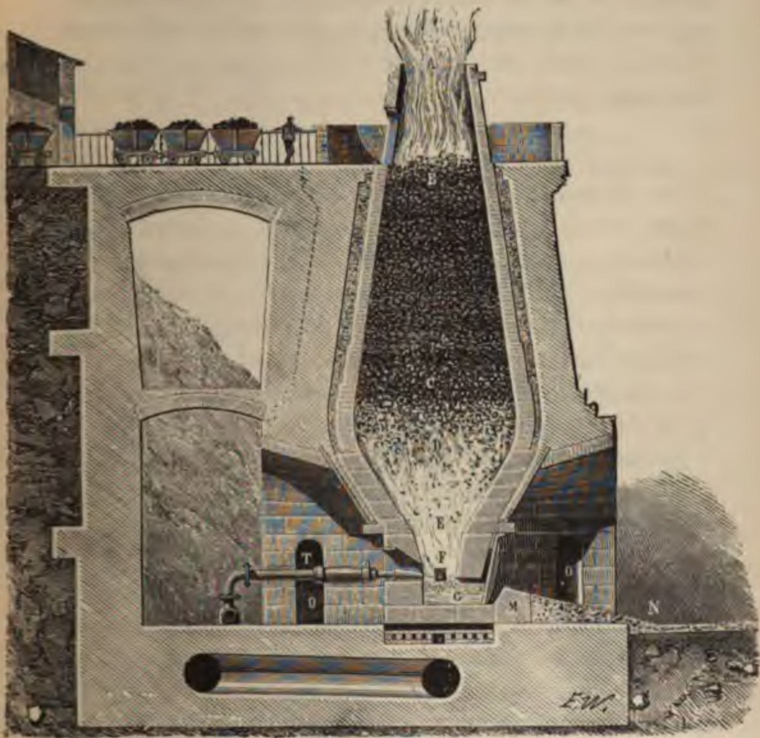
Metal, however, was only required by them for weapons and tools, a few domestic implements, and personal ornaments. Wise and learned as they were, they evidently possessed but little knowledge of the powers of fire, and were content to smelt their metals in a crucible placed on a fire whose coals were blown to a heat by human breath.

Yet, although the Egyptians allowed the art of smelting to remain undeveloped, they had caught the principle which was left for development to another race and a future epoch. The reader will probably have observed that the fire on which the crucible is placed is not an open one, but is confined on all sides except one, so as to prevent the heat from escaping into the air and being wasted. Neither is the air-blast a vague one, but is directed just where it is wanted.

Now, let the reader compare the accompanying section of a "blast furnace" of the present day, and he will see that the latter is only a development of the former, and by no means a new invention.

There is the fire confined within limits, so as to prevent waste of heat, the chief difference being that the fire is admitted into the crucible instead of playing on its exterior, and that the fused metal escapes when melted, instead of remaining in the

crucible. The celebrated "wootz" steel of India, from which the best swords and daggers are made, is prepared in furnaces almost exactly resembling those



Blast Furnace.

of ancient Egypt, and only capable of smelting small portions of metal at a time.

If the reader will again refer to the figure of the blast furnace, he will see that, at the lower arch on

the left-hand side, there is a tube which is led into the bottom of the great crucible, under the fuel. This is the "blast-pipe," which, although it is very large, and air is driven through it by huge bellows worked by a steam-engine, is identical in office and position with the mouth-tube employed by the Egyptian smelter.

THE iron being obtained, the next process is to form it into shape. As this book is not a work on technology, but only a sketch of the development of inventions, and, moreover, the limits of space are necessarily restricted, I do not propose to trouble the reader with many details.

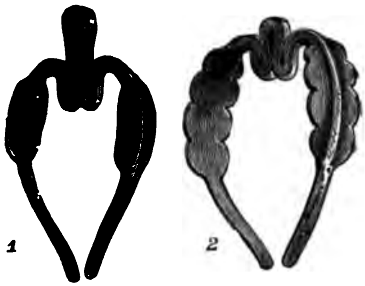
I therefore omit cast iron entirely, and can only give a few examples of iron worked, when hot, with a hammer.

Perhaps the Zulu blacksmith, as depicted on page 193, affords the best possible example of smith's work in its earliest stage of development. A large stone acts the part of the anvil, while a smaller stone, shaped and held like a pestle, is used as a hammer. How the man, with such imperfect tools, manages to produce such work, is simply marvellous.

The next improvement was evidently to fix the stone pestle on the end of a handle, and so to convert it into a Hammer which would allow much more freedom of working, and would not expose the hand to the sparks that fly from red-hot iron when struck. Then, as soon as improved smelting furnaces allowed the workmen to deal with larger masses of iron, the

The reader will see that the two pairs of tweezers which are here figured are nothing more than varieties of the large tongs which have been already mentioned. Their form is peculiarly graceful, and though they may be made of simple iron, and forged by a race of semi-savages, they might be advantageously copied by the artisans of the present day.

These instruments are drawn from specimens in General Pitt Rivers' (better perhaps known as Colonel Lane Fox) collection. They are drawn of their full size, and are made by a remarkable African tribe which inhabits a district nearly as large as England, called Unyamuezi, *i.e.*, Country of the Moon. It is situated about lat. 5° S., and long. 30° to 35° E. The full name of this great tribe is Wanyamuezi, but the name is popularly contracted to Weezee.



Central African Tweezers.

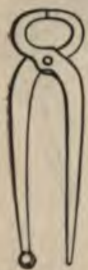
Yet another kind of tongs is needed.

Those which we have already seen are quite sufficient for turning iron in the fire, taking it out and laying it on the anvil; but, when it is necessary to take a firm hold of the iron, the tongs are inadequate to the task.

The hand which grasps them is at the wrong end of a lever, and so the hold is comparatively feeble. What is wanted is an instrument which puts the

hand at the long end of the lever, and the iron at the short end. This is easily done by taking the two iron bars, crossing them in X fashion near one end, boring a hole through them at the point of crossing, and passing a rivet through the holes. Thus we have the origin of the Pincers, which in blacksmiths' forges often have long, straight handles, and are just like the letter X, with the legs very much longer than the arm. If, then, the arms be twisted a little inwards, so as to bring the tips opposite each other, and the edges of the tips be turned inwards, we have the pincers, which are so familiar to us all.

Chisels and pincers, the one for cutting the iron when red hot, and the other for making holes in it, can easily be forged, and handles constructed by twisting a withy round them, as seen in the tomahawk figured on page 156.

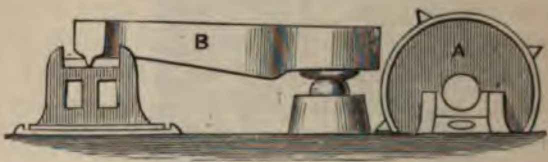

Pincers.

In order to show what kind of work can be done with very simple tools, I have here inserted a figure of the exquisite wrought-iron fountain made by Quentyn Matsys, the celebrated painter-blacksmith of Antwerp.

This beautiful object is pure hammer-work, and is a most wonderful example of harmonious composition, artistic grace, and consummate technical skill. It is easy to see that the man put his whole heart into his work, and that every blow of the hammer must have been a delight to him. Many artists have copied him, but he copied no one, and drew his inspirations directly from Nature.

Wrought-iron Fountain, Antwerp. By Quentyn Matsys.

In process of time, when man needed larger masses of iron, any hammer that could be wielded by human hands proved to be too weak for the task. A large mass of iron might be heated and laid on the anvil, but the influence of the hammers could only extend to a limited depth from the surface, so that a mere shell of wrought iron surrounded a core of brittle and semi-crystallised metal.



Helve-hammer.

A heavier hammer was therefore needed than could be wielded by man, and even the "three-man beetle" of Falstaff was insufficient for the purpose. The powers of mechanism were, therefore, called into operation, so that a hammer which could not be lifted by man might be worked by a machine. A very simple, perhaps the simplest, form of such a machine is that which is shown in the illustration, and is technically termed the "Helve-hammer."

As the reader will at once see from the illustration, the great hammer, B, is horizontal, and works up and down on a pivot at the extreme end. A is a strong wheel which moves round from left to right, and, as it revolves, lifts the hammer by means of the projecting pegs or cogs.

This is an ingenious device, and answers well enough for some purposes; but it has two drawbacks. One is, that the hammer-head can only be raised to a very limited height, so that the blow loses much of its force; and the other is, that the wheel is close to the head of the hammer, so that the workman cannot stand in front of it. A great advance was, therefore, made by a very simple process.

The handle, if it may be so called, of the hammer was prolonged for a foot or eighteen inches beyond the pivot, and the wheel was shifted to the prolonged end. The consequence was, that the cogs pressed the projecting end downwards, and so raised the head in the air. A much greater fall was, therefore, obtained, and, the space around the head being set free, several workmen could take part in the task.

This modification of the Helve-hammer is called the Trip hammer, and for many years it held almost undivided sway. Now, however, in forging of large masses of iron it has been superseded by the ponderous Nasmyth hammer, which is so gigantic in its dimensions, that, when one of these tremendous instruments was made, the upper portion of its anvil occupied three months in cooling after it had been successfully cast.

In March, 1884, I had an opportunity of seeing the Trip hammer in full work. I was engaged to deliver some lectures at North Easton, Mass., U.S.A., and, on passing through the village, was puzzled by a strange, thumping sound, the like of which I had never heard before. North Easton is one of those places which is given up to a single business. It makes

shovels, and does nothing else. But these shovels are so well made, that nearly the whole of the States are supplied from one village. On asking the source of the peculiar sound, I was taken into one of the many long, low buildings of which the place seemed to be chiefly composed, and then saw a whole row of Trip hammers at work upon the shovel-blades. The sound was quite deafening inside the building, but the effect on any one in the road was as if a gigantic coffee-mill were being turned underground.

CHAPTER XXIX.

PREPARATION OF FOOD.

Fire and Cooking—Grinding Corn — The Kafir Corn-mill— The pre-historic Corn-mill — The mills of Palestine—Preparation of Manna—The "Ass-millstone"—Samson in the mill — Sound of the grinding — Pounding corn — The Ovambo corn-pounders—The Poi mallet—Preparing Cassava—The cassava press, or Matappi—The Sieve, or Colander—The Cassareep-pot—Turtle-eggs.

THE primary object of fire being the preparation of food, we will next take a few examples of primitive cooking.

Taking bread, of whatever kind, as the "staff of life," we will see how it has been prepared from the remotest antiquity. The first process of preparation is the grinding the raw material into flour. Throughout the Scriptures we find frequent references to the process of grinding.

This was always done by rubbing the grain between two stones, and, as but a small amount could be procured in this fashion, it was the custom then, as it is now in Eastern lands, only to prepare enough flour for the coming meal, or, when there was a large staff of servants, for the consumption of the day.

The simplest plan was that which is shown in the illustration on page 447, the mill being so small that it can be transported without much difficulty.

This property is of exceeding value in nomad races, and was absolutely needful to the Israelites during the Wanderings, as they had no home, and never knew from hour to hour when they would receive the command to strike their tents and march. Vast numbers of such mills must have been carried in order to prepare the food of so great a host. Even though the Israelites were fed with manna, they were forced to grind or pound it before it was fit for food: "The people went about and gathered it, and ground it in mills, or beat it in a mortar" (Num. xi. 8).

Ancient Egyptian Baker.

It was evidently this kind of mill to which allusion is made in the Mosaic Law. "No man shall take the mill or the upper mill-stone to pledge; for he taketh a man's life to pledge." The attitude which is assumed by the grinder is mentioned in Ex. xi. 5, when the death of the first-born was announced to extend "from the first-born of Pharaoh that sitteth upon his throne, even unto the first-born of the maid servant that is *behind* the mill," *i.e.*, from the very highest to the very lowest.

Kafir Corn-mill.

Here is a figure of the mill of pre-historic times. A mere glance at it will show its identity with that of the Kafir of the present time, and we cannot doubt that it was used after a similar fashion, the women being always the grinders.

After the Wanderings were over, and the Israelites had settled in the Promised Land, it is evident that they abandoned the use of this primitive device, and generally employed the hand-mill or "quern," which is still in constant use. It consists of two circular stones, the lower or nether millstone being

Corn-mill.

conical on the upper surface, and the upper millstone having a corresponding socket so as to fit over the lower stone. There is a hole in the middle of the upper stone, into which the corn is continually poured, and this stone is continually worked half-way round, and back again, by means of an upright handle near the edge. The usual custom is, that each mill is worked by two women, who sit on the ground opposite each other, with the mill between them. Each of the women holds the handle, and they sway the stone

[redacted]

backwards and forwards, usually accompanying their task with a sort of crooning song.

To this passage allusion is made by our Lord in the well-known prophecy, "Two men shall be in the field ; one is taken and one is left : two women shall be grinding at the mill ; one is taken and one is left." A more forcible metaphor to an Oriental mind cannot be imagined.

At early dawn in the unchanging East, the women rise and begin to grind the corn for breakfast, so that the sound of the grinding and the song of the women is a token of peace and plenty. Hence, the prophecy of Jeremiah, "Moreover, I will take from them . . . the sound of the millstones" (Jer. xxv. 10). Also, see Eccles. xii. 3, 4. "In the day when the grinders" (Heb. "grinding women") "cease because they are few . . . when the sound of the grinding is low." No better idea of utter desolation could be conveyed than the silence of the mills at break of day.

As civilisation advanced and men gathered themselves into cities, public bakeries were established, in which large quantities of corn were ground daily. The little hand-querns would be quite useless for such a purpose, and, therefore, the millstones were made so large that they were turned either by slaves or by asses.

In the former case, there were square sockets cut in the upper stone, into which were inserted bars like the capstan bars of our own time, and the slaves had to walk round until the requisite amount of flour was produced. It was to one of these mills that Samson was bound when "he did grind in the prison-house"

(Judg. xvi.). Millstones of this description were found in the bakers' workshops of Pompeii, the loaves being still in the ovens, and the unground wheat in the bins.

In the latter case, asses or oxen were harnessed to the upper stone, as shown in this figure of a lime-mill, the only difference being in the shape of the stone. This is the stone to which allusion is made in Matt. xviii. 6: "Whoso shall cause one of these

Lime Mill at Cairo.

little ones which believe on Me to stumble, it is profitable for him that an ass-millstone be hanged about his neck, and he be sunk in the depth of the sea."

I may here mention that the "kneading troughs" mentioned in Ex. xii. 34, were merely circular pieces of leather, such as are still used in the East. They could be easily bound up with the clothes, the dough remaining in them.

Ovambo Women pounding Corn.

There are many parts of the world where this custom is still followed, and a very good example of it is given in the illustration on page 451, which represents two Ovambo women engaged in the daily task of pounding corn. The sketch was made on the spot by the late Mr. T. Baines, and, together with many other sketches and all his diaries, was kindly placed at my disposal when I was engaged on my "Natural History of Man."

These interesting people inhabit a large district in Africa, somewhere about lat. 18° S., and long. 15° E. They seem to be far ahead of the neighbouring tribes, and—wonder of wonders—are honest! Another point in their character that shows their superiority to many of their countrymen is, that they take care of the old, the sick, and the infirm, instead of abandoning them to die, as is the usual custom.

According to invariable custom, the preparation of the corn is left entirely to the women.

The reader will observe that a little boy is complacently watching the process. Had the child been a girl of the same age, she would have been furnished with a pounding-stick,—we can hardly call so long and weighty a staff by the name of pestle,—suitable to her strength, and have been expected to help in the labour. But the boy is serenely conscious of his superior sex, and would not condescend to soil his hands with a pounding-stick.

Passing from Africa to the tropical Pacific Islands, we find that pounding is the universal mode of preparing farinaceous food.

One of these preparations, called Poi or Peee, is in

[redacted]

universal requisition. The fruit of the bread-tree is pounded with water in a mortar, and then allowed to remain until a semi-putrefaction takes place, when it is considered as fit to be eaten.

To European palates, both the taste and odour of poi are simply disgusting; but the natives are wedded to it, and, no matter how much turtle, fish, and other food they may have eaten, must always complete their repast by a bowl of poi.

Poi Mallet or Pestle.

The mode of eating it is as offensive as the taste and smell. If each person had his or her own portion in a separate vessel, it might be endurable, but as all eat out of the common bowl, the European guest does not feel much inclined to join his hosts in their feast. When ripe and fit to eat, poi is something like very sour paste, with the ropy consistency of treacle. The mode of eating it is strictly according to native etiquette. The first and middle finger of the right hand are kept extended and tightly pressed together, the thumb and other fingers being closed. These two fingers are dipped into the poi, and emerge from it with the viscid mass hanging in ropy strings.

A rapid twist of the hand disengages the dripping poi, and catches it in the fingers, and another twist carries the fingers into the mouth, where they are

sucked clean, and are then plunged into the bowl for another dip.

Yet another mode of obtaining farinaceous food.

In some parts of tropical America, the root of the cassava or manioc plant (*Jatropha manihot*) takes the place of the wheat, maize, bread-fruit, &c., of the other parts of the world.

This root is not ground or pounded, but scraped, by being drawn over a board stuck all over with sharp-edged flint-flakes, and thus reduced to a state just like that of horseradish when prepared for the table.

Another process now takes place. The cassava root is full of a juice which is poisonous until boiled, and which must be extracted before the root can be ground and converted into bread.

First of all, it is put into an ingeniously-made colander, figured on page 570, and much of the moisture squeezed out of it. When it is about half dry, it has to undergo a still greater pressure, and for this purpose it is put into the unique press which is given on page 455 and which is called by the name of Matappi or Tipiti. It is a tube, open above and closed below, and is made of strips of a species of calathea.

The length of this tube is from six to seven feet, and no one who was unacquainted with its use could offer any correct suggestion on the subject. In two museums I have seen them labelled as quivers, and filled with the long arrows which have already been mentioned.

The matappi is literally crammed with cassava,

and, as the strips of bark of which it is made are woven quite loosely together, it becomes very much shortened and widened. It is then suspended by the upper loop to a beam of the hut or a convenient tree-branch. An earthen vessel is placed under it, and a heavy weight is attached to the lower loop.

An equable pressure is thus made throughout the entire length of the matappi, and the expressed juice falls into the pot. When no more juice can be obtained, a pole is thrust through the loop for about a foot or eighteen inches, and made fast to a post of the house, or to the tree-trunk. A woman then presses down the other end of the pole, and at last sits on it, the leverage being exceedingly powerful, and forcing out the last drops of liquid.

Cassareep Bowl.

The cassava shavings are then rubbed through a basket-work sieve, and finally mixed with water, formed into flat cakes, and baked on flat, heated stones.

The juice is not wasted. It is mixed with cayenne pepper and other flavourings, boiled, and is the celebrated cassareep or pepper pot, which plays so important a part in West Indian cookery. The material of the cassareep pot is soft and thick, so that it absorbs

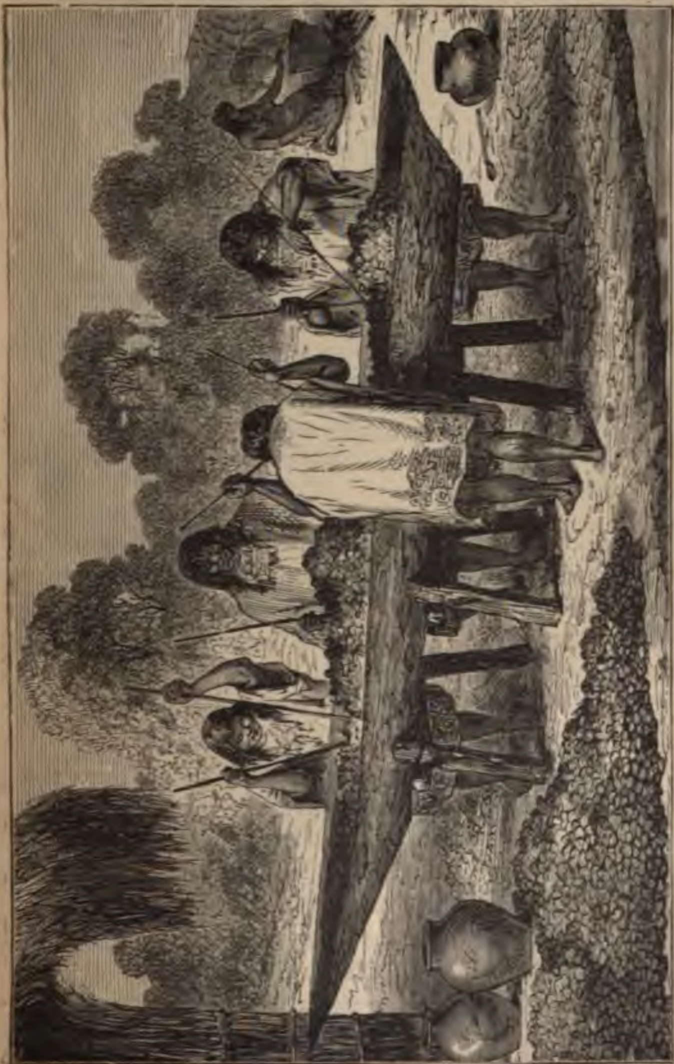
Cassava Pr

the juice, and, even if empty and dry, will, if filled with rice, pieces of chicken, and similar viands, impart its grateful flavour to them when cooked. Even without the additional ingredients, cassareep is almost an essential part of the native diet, the flat cassava cakes being dipped in it before being eaten.

The accompanying illustration depicts a common scene among the natives of Guiana.

In the centre there is a canoe raised on trestles, and containing a number of spherical objects, which some Carib men are pounding with sticks (*see* next page). These objects are the eggs of the river turtle (*Podocnemis expansa*), which in the month of February are deposited in vast numbers. The female scrapes away the sand with her hind legs until she has made a hole of suitable dimensions, and in this hole she deposits several layers of the eggs, averaging about one hundred and fifty in number.

These eggs are spherical, and have no shells. Only the yolk of the egg is eaten by white men, but the Caribs are not fastidious in the way of food.



CHAPTER XXX.

PREPARATION OF FOOD (COMPLETED).

Intoxicating drinks—Palm wine—Kafir beer, or Outchualla—A fattening food rather than a drink—Mode of preparation—Beer-baskets—Kava drinking—Strange ceremonies—Piwarri drinking and accompanying ceremonies—"Chica" and "Mudai"—Preparation of mudai—Milk among the Kafirs—"Amasi"—The milk pail, bowls, and basket—Kafir spoons—Milk bag—Making butter—Churning rain—The Chinese "chopsticks" and mode of using them—Soy, and its use.

THE use of the canoe for such a purpose brings us to a remarkable phase in savage life.

It has often been said that drunkenness among savage races is the result of intercourse with the whites, and that, until the invasion of these lands by the white races, intoxication was not only unknown, but impossible.

Now, although it is a too patent fact that the whites have furnished these savages with fiery spirits of the coarsest and roughest description, charged with the maddening fusel oil, all that they did was to sell to the natives a liquid of greater intoxicating powers than they could make for themselves.

Excepting the inhabitants of the polar regions, where the severity of the climate is a bar to fermentation, man in every part of the world has contrived to

procure intoxicating drink. Sometimes he uses intoxicating herbs, such as the well-known Indian hemp, or the opium, which De Quincey refused to consider as an intoxicant. Sometimes he uses both.

The drinks are of various kinds, the simplest being the "toddy" which is obtained from the sap of a palm. This juice is perfectly harmless if drunk immediately, but, if allowed to remain undisturbed, fermentation takes place, and then so large a proportion of alcohol is produced that it becomes a powerful intoxicant.

In like method, the Kafir tribes are adepts at making a kind of beer called "outchualla." Maize is generally employed for this purpose, though millet is sometimes substituted.

The mode of preparation is much like that which is in use among ourselves. It is wrapped in wet mats, so as to make it sprout, and is then heated and dried, the incipient plants being thus killed, and the grain converted into malt. It is then boiled, and fermentation is accelerated by means of a sort of ice-plant, which answers instead of yeast.

It is generally kept in baskets made of a sort of rush, and woven so closely that not a drop escapes. A small basket of this description was in my collection, and I once exhibited it, filled with milk, at a conversazione.

The illustration shows all the processes at a glance.

In the middle of the hut there is the characteristic fireplace, upon which is the great vessel containing the "mash." On the left is a wooden beer bowl, and

beyond it is a woman straining off some beer into a similar vessel. The peculiar strainer (which looks

Kafir Women Brewing Beer.

very like our modern jelly-bag) and a skimmer are seen on the ground. Both these implements will be

figured and described when we come to treat of basket-work.

The kneeling figure on the right is ladling some beer into a small basket for present use, and the other woman is pouring beer into one of the large store

Panda and Beer Basket.

baskets, several of which have already been filled, and are arranged along the sides of the house.

The use of this beer, which looks and tastes much like very weak gruel, and is rather fattening than intoxicating, is mostly restricted to the chiefs and the wealthy, and those men drink it almost inces-

santly, so that they become inordinately fat. Panda, for instance, the father and predecessor of Cetewayo, could never be happy without his beer basket, and even at a review must needs have the basket at his side, and a page to act as cup-bearer, as shown in the accompanying illustration.

The cup is mostly made of an oval gourd, with part of the top sliced off, so that it looks very much like a large egg. The ladle is made of a similar but smaller gourd, fastened to a wooden handle long enough to reach to the bottom of the basket.

To the incessant use of this beer is due much of the enormous dimensions which are attained by these Zulu chiefs. Cetewayo afforded a good example of the aristocratic bulk; but, as may be seen from the illustration, his father was much more obese, and, when the sketch was taken, found that a walk of two hundred yards was so fatiguing that a short repose and refreshment were necessary before he could sustain the exertion of seeing his troops march past.

The particular preparation, however, to which I at present allude is one that is prepared in a way which to European minds is indescribably repulsive. It consists in chewing certain farinaceous substances, placing the chewed morsels in water, and leaving them to ferment.

Throughout the tropical Pacific Islands this custom prevails largely, though it is now shorn of many of its ceremonial adjuncts. The drink in question is called cava or kava (pronounced kah-vah), and is prepared as follows.

The kava plant (*Piper methysticum*) belongs, as its

[redacted]

name imports, to the pepper tribe. The root is first scraped, much like that of the cassava, and the shavings are masticated for some time.

The persons who perform this office are always young, and are not allowed the privilege until their mouths and teeth have been carefully examined. They take the greatest care to prevent the saliva from mixing with the kava, so that, when it is taken from the mouth, it is perfectly dry.

A sufficient number of these pellets are placed in a peculiarly-formed wooden bowl, and are not thrown

Kava Bowl.

carelessly into it, but arranged in regular circles. Water is then poured into the bowl, and the whole is kneaded together for some little time, during which the necessary fermentation takes place.

Then a bundle of fine bark fibres (taken from a hibiscus-tree, and looking much like the shavings used to cover fireplaces in the summer), is spread over the surface of the water, and its edges brought down on either side until all the kava shavings are included in it.

The "fow," as the fibre bundle is called by the Tonquas, is then lifted out of the bowl, held over it, and twisted and wrung with such skilful strength,

that every drop is squeezed out of it. The liquid is then served in extemporised cups made of the unexpanded leaves of the banana-tree, cut into pieces about four inches square, and tied at the corners.

Mr. Mariner, to whom we owe our knowledge of the remarkable etiquette with which the ceremony of making and drinking kava is, or rather was, surrounded, states that he had some conversation with the king upon the mode of preparation, and asked him how it was that a Tongan, who would refuse to touch a fruit if another had bitten it, could drink the kava. The king could only reply that it was a matter of custom, and then, on the *tu quoque* plan of argument, taxed Mr. Mariner with having confessed to the almost incredible enormity of habitually drinking the milk of a beast!

Experiments have been tried with the kava-root, by scraping it as usual, and then grinding it, in imitation of the ordinary process. But it was of no use, and there is little doubt that any farinaceous material would produce the same results if prepared in the same way.

This opinion is strengthened by the fact that the Guianan aborigines employ an exactly similar mode of preparing an alcoholic drink, which is called Piwarri, or Paiworie. In this case the cassava is used instead of the kava, and the natives are inordinately fond of it. The amount of alcohol is extremely small, so that great quantities must be used in order to intoxicate a man. So, instead of making it in comparatively small vessels, as is done with kava, they clean out a canoe and employ it as a piwarri

bowl, just like the Caribs with the pounded turtle-eggs. At a great feast several canoes of piwarri will be filled and emptied.

In Araucania a very similar drink is made, and is called Mudai.

Wheat is boiled in water for several hours, and then the water is poured off, just as in making tea, and is allowed to cool. Meanwhile a number of pellets have been prepared of the same material, and are put into the water. Fermentation then takes place, and the mudai is strained off into jars and kept for use.

Its flavour is slightly acid, and in hot weather is well adapted for quenching thirst. The Araucanians also make a sort of cider called chica, procured by beating green apples to a pulp, and mixing them with water.

One traveller, who was very thirsty, and hastily drank a glass of *chica de manzanos*, declares that "to call it vinegar would be too high a compliment, and to add that it was flavoured with gall would convey no adequate idea of this abominable stuff." His kindly hosts thereupon offered him some mudai, with which he was very much pleased, and which he drank steadily for some days before finding out the nature of its preparation.

Large quantities of these wheat pellets are constantly prepared by women, dried in the sun, and stored for future use. Several of them were in my collection.

If the reader will refer to page 447, he will see that the young man who is sitting by the grinding woman is busily engaged with a spoon and a bowl.

Both these articles are carved out of wood, and, although the Kafir is, as a rule, a very indifferent artist, he condescends to spend much time in decorating these implements, several of which are here shown.

The first is a milking pail, though its use would hardly be conjectured from its appearance. Milking his cows is the only work that a Kafir really likes. He sits on the ground, holding the pail by his knees just under the two projections, and there milks the

Zulu Milking Pail and Bowl.

animal, giving vent the meanwhile to a series of whistles, grunts, yells, and screams such as none but a Kafir can perpetrate. The cows are so used to these noises that no one but a Kafir can milk them.

Tastes differ in different countries. In this country we consider a draught of fresh pure milk as an acknowledged luxury, and there are many persons who keep their own special Alderney cow for that purpose.

But in South Africa the taste runs in the opposite

[redacted]

direction, and, just as a Chinaman thinks an addled egg of a year or two old to be far superior to the new-laid egg which we so much prize in this country, so the Kafir turns with contempt from fresh milk and prefers it sour.

We, in our ignorance, as the Kafir would say, take care to wash our milk vessels with boiling water, so as to insure their absolute freedom from the taint of sour milk. But the Kafir knows better, according to his ideas. He would not be guilty of such folly as washing a milk vessel, and when he makes a new one he takes care to put some sour milk into it before he fills it with fresh milk.

One of these milk bowls is shown in the illustration. The reader will probably have noticed that, although this bowl is cut out of a solid block of wood, the exterior is carved in imitation of basket-work.

The effect of this admixture of sour milk with fresh is that the whole turns sour and becomes a sort of curds and whey. It is then beaten up with spoons until it assumes the consistence of clotted cream, and is then known under the title of amâsi.

It is very nutritious, and is largely used in feeding children. Although, at first, it is not at all agreeable to a European palate, it soon grows upon the taste, and those at first who were loudest in their disapproval become as fond of it as the Kafirs themselves.

In the illustrations on page 468 are shown a jar and bowl, which are used by the Hottentots for the same purpose, and above them is seen the remarkable knife with its curved blade which is used for hollowing these utensils.

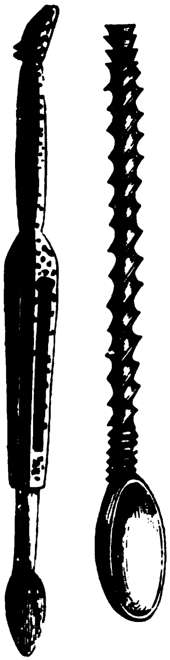
Throughout a very large portion of South Africa the amâsi forms a staple article of food, and if a native can supply himself with amâsi to mix with the meal, which is ground for him by one of the women, he counts himself a happy man. In the illustration to which reference has been made, the young Zulu is seen in the act of mixing the meal with amâsi.

Some forms of the wooden spoon by which the porridge, if we may so call it, is mixed and eaten, are shown on the next page.

Knife, Jar, and Bowl.

The first is ingeniously carved into the form of a giraffe, the spots of the animal being well represented by charring the yellowish wood. I think that this is rather a Bechuana than a true Kafir spoon, and am quite sure that it would be beyond the powers of an ordinary Zulu. If the reader will refer to the Bechuana dagger which is figured on page 116, he will note the resemblance between the workmanship of the dagger handle and that of the spoon.

'he second spoon is remarkable for the carving of handle, which is cut so regularly and boldly that ›oks as if it were turned in a lathe. In order to : to this spiral pattern a bolder effect, the carver



Spoons for eating Porridge.

Wooden Spoons.

first charred, and then polished the interior of the ings. The handle of the fourth spoon is carved mitation of a number of rods bound together at middle and at the end.

Vhen the Kafirs, as is often their custom, unite ι plentiful though simple feast, they prepare the

porridge in a large pot, and while it is being cooked sit round it and amuse themselves with their strange native songs, eked out with grunts and whistles. For this kind of entertainment a peculiar spoon or ladle is made. The handle is slightly curved, and the bowl, which is shallow, and rather larger than that of our gravy spoons, is set in the handle at an angle like that of the beer-skimmers which are here represented.

When the repast is ready, the founder of the feast takes the spoon, stirs the porridge, takes out as much

Zulu Beer-skimmers.

as the bowl will contain, and then thrusts it into his huge mouth. He always holds the spoon upside down, so that he can lick it clean as he removes it from his mouth, and then passes it to his next neighbour. It is evident that, if every one had his own spoon, the man who had the largest spoon would get the most porridge, and so it came to be the practice that one spoon should serve impartially for all.

Instead of using baskets or wooden bowls for the purpose of keeping milk, the Bechuanans, to whom reference has several times been made, employ a bag made of skin, such as is shown in the illustration on page 472.

The workmanship of these bags is wonderfully

good, and far superior to that of the well-known wine-skins of the East, unfortunately translated as "bottles" in the authorised version of the Bible.

These vessels are little more than the skins of animals very carefully taken off, sewn together, and the apertures of the neck and leg are firmly tied up, with the exception of one of the legs, which answers the purpose of a spout or tap. The ancient Greeks had water-carts made in a similar manner, the entire hide of an ox being used for the purpose.

But the Bechuanan workman takes the skin of some animal, choosing the part which covered the shoulders as being the thickest and strongest. After cutting it carefully to a pattern, he sews it together with thread obtained from the long neck-sinews of the same animal. As the stitching is done while the hide is still wet, the stitches sink deeply into its substance, and make the seam perfectly water-tight.

The skin of the quagga is generally chosen for this purpose, as not only is it strong and pliant,

1.

Kafir Ladle.

but it possesses a kind of musky odour which is very grateful to Bechuanan palates.

Like the Zulus, the Bechuanans prefer sour milk, and, whenever they make a new milk bag, always put a little sour milk into it first.

These milk bags are also employed for another purpose. Like many dark races, the Bechuanans are always hankering after grease wherewith to anoint their bodies. As long as it is grease, they are not very fastidious about its source, and the more rancid it is the better they seem pleased.

Bechuanan Milk Bag.

Some, however, who are gifted with nostrils more delicate than generally fall to the share of their fellow-countrymen, prefer fresh and sweet grease to the old and rancid material. Accordingly, they convert their milk-bags into churns.

The bags are suspended to the rafter of the hut, and a thong tied to the lower corner. By means of this cord the bag is kept incessantly jerked and shaken, so that at last a few small lumps of butter are found. No Bechuanan would desecrate butter by eating it, even the smallest portion

[redacted]

being put to the sacred use of lubricating their bodies.

The late Dr. Moffatt mentions a very unexpected use which was made of the milk-bag by a quick-witted man.

This man was a conjuror, or "medicine man," and enjoyed a vast repute among his people. Now, like the North-American Indians, the Kafir tribes fully believe that their medicine men have command over the elements, and that by their incantations they can draw down rain upon the earth.

As the people never dare to approach their medicine man without a gift, the office is a very profitable one, and well worth the long and painful ordeals which have to be endured before a man can be admitted into that sacred band.

This exalted rank, however, has its drawbacks; for, if the people need rain and the conjuror cannot invoke it successfully, he runs a great risk of being torn to pieces. Not that they would dream of thinking him an impostor; but the very fact of his failure proved in their eyes that he had offended the powers above, and ought to pay for his offence with his life.

The conjuror in question had exhausted almost every ruse in his power, but day after day passed and yet no rain. At last a shower fell, and the chief people ran to his hut to congratulate him. To their astonishment he was asleep! It might have gone hard with him; but he was a man of ready resource, and, as he opened his eyes, he saw his wife shaking the milk bag to obtain some butter for her hair.

Pointing to her, he said, "Do you not see my wife churning rain as fast as ever she can?"

The ruse answered, and he not only saved his life, but added to his reputation.

Chopsticks.

OUR fast waning space compels me to close this branch of the subject with a few remarks upon the singular implements which the Chinese employ in eating their food.

The usual set of table implements is here shown, and consists of a knife, two "Chopsticks," and case in which they are kept. The case which is represented in the illustration is covered with tortoise-shell, as is also the handle of the knife.

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Sometimes, a bone or ivory tooth-pick is added, as at Fig. 3.

Of these instruments, the chopsticks are the most important. Very erroneous ideas prevail as to the mode of using these very simple implements, the popular notion being that one is held in each hand, as we hold the knife and fork. Indeed, I have seen illustrations representing Chinese as using their chopsticks after that fashion.

As I was instructed in the art by no less a personage than Chang, the celebrated giant, and taught to eat rice with them, I can tell the reader the right use of the chopsticks.

They may be made of any material, but are mostly of bone or ivory, and about ten inches in length. They lessen gradually from the base to the tip, which is never pointed. Both chopsticks are taken in the right hand, the first passing over the side of the base of the fore finger, then under the thumb-joint, and then between the end joints of the middle and third finger. By passing the thumb downwards, this chopstick is held firmly, and never moves.

The second chopstick is held between the tips of the fore finger and thumb, so that its point can be brought against the tip of the other. With these two tips small objects can be readily picked up; and, as in China the viands are always cut into morsels before they are served, the chopsticks answer the same purpose as the fork among ourselves.

When rice is eaten, the bowl containing it is held in the left hand near the mouth, while the tips of the

chopsticks are crossed like the letter X, and act as a spoon. Should the Chinaman be in a hurry, he

Chopsticks and Case.

scoops the rice into his mouth with such rapidity that it disappears as if by magic. So completely do these instruments deserve their Chinese name of "kwai-tsze," or "the nimble lads," that a Chinaman can even eat soup with them, whipping it into his mouth in a continuous stream.

Not that the fork and spoon are not used in China, for both are used when required, as may be seen by reference to the illustration.

The figure represents a complete set of table implements which was kindly lent to me by Mr. Wareham. The case is covered with shagreen, and closed at each end by a cap, which slides up and down a narrow leather strap. The case contains two pairs of chopsticks, two spoons, and a knife and fork for the carver.

Into the bottom of the case fits a shallow, quatre-foil-shaped tray of metal, which, when not in use, is held in its place by the lower cap. Its object is the reception of soy, the universal sauce of China. This tray, or saucer, is shown at Fig. 10.

The Chinese do not, as we do, mix their sauce with their viands, but pour a few drops of soy into the little saucer, and every now and then dip a morsel lightly into it. If, for example, they are eating rice, they never pour the soy over the rice, but eat it plain, occasionally picking up a single grain between the tips of the chopsticks, and dipping it into the saucer.

CHAPTER XXXI.

CLOTHING.

The Present a key to the Past—The Needle and the Awl—Pre-historical awls—The Kafir awl and its work—Skin-dressers — The Fur-mender — Hide-dressing — Eskimo garments — Thong dresses — African Thong aprons—Feather aprons of Guiana—Grass aprons of Fiji—The Snow cloak of Japan and China—The Phormium cloak of New Zealand — The Primitive Loom — Invention of the Shuttle—The Old English loom—The Australian Grass cloak—The New Zealand Rain cloak—Thread-making—The Distaff and Spindle—The Spinning-wheel—Rope and string makers — Shears and scissors — Bead aprons of Guiana—Queyus.

THE same cause which has debarred us from possessing the handles of pre-historic tools and weapons, the shafts of pre-historic spears and arrows, and the bows by which the arrows were propelled, has deprived us of the clothing which our predecessors wore in the past ages.

But, though we do not possess the actual clothing which they wore, we do possess many examples of the instruments which they used in making those clothes. Following, therefore, the plan which has been pursued throughout the work, we may make the Present a key to the Past, and, by noting the handiwork of those people which use similar tools at the present day, may safely conjecture the material

and form of the garments made by those who used them.

There is no doubt that the first clothes which deserve the name were made of the skins of slain beasts. In this category I do not include the little scrap of fur which a Fuegian throws over his shoulders, or the leopard skin by which a savage chief denotes

Flint Awl.

Bone Awl.

Deer-horn Awl.

the rank which he holds. Clothes which are made of skin must be sewn together; and, in order to perform this task, man must provide himself with a boring instrument with which he may make holes, and a thread which he can pass through them.

This process seems, in our sewing-machine times, to be very slow and clumsy, but we have only to visit

a working saddler or shoemaker to see him use awl and thread exactly as was done in the pre-historic epochs.

In order to illustrate the analogies between ancient and modern sewing, I have selected three examples of pre-historic awls.

The first, which is most ingeniously chipped out of flint, is probably as much anterior in date to the two which are next it as they are to the awl which is now being used by a saddler within a stone's throw of my window.

Several of these flint awls give indications that, after they had done their duty in boring holes through skins, they had been utilised as the heads of drills, such as have already been described. Such, however, could not have been the case with the bone and deer-horn awls, which could only pierce soft materials, and could have been used for no other purpose than to join together the pieces of fur which constituted a primitive garment.

As to the kind of work which such instruments could perform, we have only to look to the corresponding tools of the present day.

In the illustration on page 481 are shown three examples of the Zulu needle, as it is called, but which, as it has no eye, can only lay claim to the name of awl. The instrument varies somewhat in size, but is, on an average, from four to five inches in length; and it is nothing but a mere slender rod of iron, slightly tapering to a sharp point at one end, and having the other end forged into a head, more or less ornamental.

Zulu Needles and Sheaths. (From my Collection.)

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requires exceedingly skilful manipulation, and which is mostly left to a comparatively few. There are always holes in every skin, sometimes produced by bullets and sometimes by assagai heads. These holes would not only interfere with the efficiency of the garment, but would be very unsightly unless carefully filled with fur of corresponding colour. The kaross cobbler, if we may use the word, keeps by him a large stock of meerkat and other skins, and when a skin is sent for repair he looks out for one in his own stock which has the same colour in the same part of the fur. He then cuts out a piece, trims the bullet hole until it is quite circular, and lets in a new piece, with such exactness of fit and such nicety of arrangement in the "set" of the hairs, that the keenest eye can scarcely detect any imperfection in the fur.

The stitch which the fur-mender uses is a very peculiar one, and very much like that of our own tailors which is employed in "fine-drawing" a rent.

The reader will now see the similarity between the awl needle of the Kafirs of the present day and the flint, bone, and horn implements of pre-historic times, and may, therefore, safely conjecture that the handiwork achieved at both epochs must partake of the same character.

As might be expected, from the peculiar lives which the Eskimos are obliged to lead, they are adepts in the art of fur-dressing. They have no other clothing than that which is obtained from the beasts which they kill, the seal being their chief source of supply. In fact, the seal tribes are the staff of life to the Eskimo. Vegetable food he knows not,

depending almost entirely upon the seal for food, clothing, and fire, the last-mentioned necessary being a sort of rude lamp cut out of stone, and hung to the roof of the snow hut, or "igloo."

It is scarcely wanted for cooking purposes, the heat which it gives being insufficient for this purpose (unless a sort of semi-stewing can be called cookery), and the Eskimo preferring to eat his seal raw. But, it gives light, it melts snow for drinking purposes, and, above all, it dries the garments of the men when they come home from their hunting expeditions. These garments, however well they may have been originally prepared, become hard and stiff when dry, and then have to be restored to flexibility by being chewed all over by the women. Even the soles of the boots have to be subjected to this process, and, as they are made of walrus hide, it follows that the strength of jaw possessed by an Eskimo woman must be equal to that which Father William procured during his study of the law.

When the skins are taken from the animals, they are carefully scraped and kneaded in the inside with the instruments which are here figured. They are then pegged out in summer-time, the hairy side being downwards, and continually rubbed until they are quite dry. In the winter, when no peg can enter the frozen ground, the skins are stretched on hoops and hung over the lamp. For the reception of these clothes, skins, &c., a net is hung over the lamp, and serves the same purpose as the "rack" of a railway carriage.

It is now necessary to give a short space to the Thong dress, which exists with great variation of material in all the various parts of the world.

Eskimo Scrapers. (From the British Museum.)

Mostly, the thong dress belongs to the unmarried women, who exchange it upon marriage for the leather apron, which is to them what the wedding-ring is to ourselves. Sometimes, however, as in Southern Africa, it is used by both sexes, though with a difference of arrangement.

In Africa, for example, which produces plenty of fur-bearing animals, this garment is made of skin, sometimes dressed with the fur, sometimes without it. If the reader will refer to the illustration on page 307, which represents two young Zulu warriors, he will see that they are wearing a sort of apron made of fur ropes.

These are generally made of monkey-skin, and in the following manner:—The fur is cut into strips about two inches in width, and transverse slits are cut in the strips at about an inch apart. As the skin dries, it curls round so as to make a sort of fur ringlet. Two sets of these "tails," as they are popularly called, are made, one set being seven or eight inches longer than the others. They are then tied on a plaited cord in such a manner that, when the cord is tied round the waist, the short set of tails hangs in front and the longer set behind.

If a man should be a successful as well as a bold leopard-hunter, he makes the teeth and claws into necklaces and bracelets, saves the skins for a kaross, wears the tails as substitutes for the monkey-skin, and thus becomes a very great man among his people.

The thong dresses worn by women are of different description.

A strip of skin is cut of a width corresponding

with the depth of the intended garment, and the leather is then cut into narrow strips, varying in number and breadth according to the locality. The aprons, for example, that are worn by the Nubian girls, are cut into multitudinous thongs scarcely thicker than packthread, whereas those of West Central Africa have only a few strips, which are of considerable comparative width.

Those which are figured in the illustration belong to the Neam-Nam tribe, which has already been mentioned in connexion with the missile knife. They are made in the following fashion.

Neam-Nam Women's Aprons.

At the top of the apron is a square piece of leather, doubled and beaten flat while wet. To each are sewn three layers of leathern

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Feather Apron. (F

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In the feather apron which is shown on page 488, the reader will at once recognise the same principle.

Instead of the leathern thongs, strips of monkey-skin or leopard-tails, the long feathers of the macaw's tail are used. As the reader may see, they are fastened upon the waistband in a very simple manner, the quill being squeezed flat, bent over the cord, and the loop secured by a lashing of cotton-string. The waistband is also of cotton. The colours of these aprons depend on the species of bird from which the feathers are taken. That which is figured is made of the feathers of the red and blue macaw (*Ara macao*). The original may be seen in the British Museum.

Feather Apron. (From my Collection.)

The accompanying figure of a feather apron can do no more than give the general shape and form of the patterns, but its beautiful and harmoniously-arranged colours cannot be even indicated by the plain black and white of printer's ink.

The apron is not for ordinary use, but is an orna-

mental garment, expressly made to be worn in dances on festivals.

The body of the apron is made of cotton-strings woven closely together except at the upper portion, where they are laid parallel to each other. At each side is a long strip of black monkey-fur, and a row of black feathers is fastened at the lower and upper edge of the apron, so as to set off the brilliant colours by enclosing them in a black frame.

The light-coloured transverse bands are bright yellow, and the groundwork is composed of small scarlet feathers. The remarkable angular figure in the centre has the upper half of yellow and the lower half of blue feathers.

Immediately above the apron itself are the parallel strings which have already been mentioned. Upon them are sewn three rows of the elytra, or wing-cases, of the large and brilliantly-coloured Buprestis beetle. These "shards," as Shakespeare calls them, are hung very loosely on the strings, so that they rattle at each movement, and serve to mark the time of the dancers' steps. This apron was in my collection.

Another reference to these wing-cases will be found in another page.

Transporting ourselves again to the tropical Pacific Islands, we find the thong dress in great variety. In those islands, however, there are no large indigenous mammalia, so that it would be impossible for the natives to procure garments of skin or fur, while the bright-plumaged birds are so scarce that, as the reader has already seen, the scarlet and yellow feathers, which are so plentiful in the dresses and

ornaments of Guiana, are in these islands reserved as tokens of rank.

Perforce, therefore, the inhabitants are obliged to fall back on the vegetable world for their clothing, and so we find the men clad in the beautiful fabric which is called by various names according to the locality, and which is made from the inner bark, or "liber," of the paper-mulberry.

Space is lacking for a description of the manufacture of the "mâsi," as it is called among the Fijians, and "gnatoo" among the Tongans.

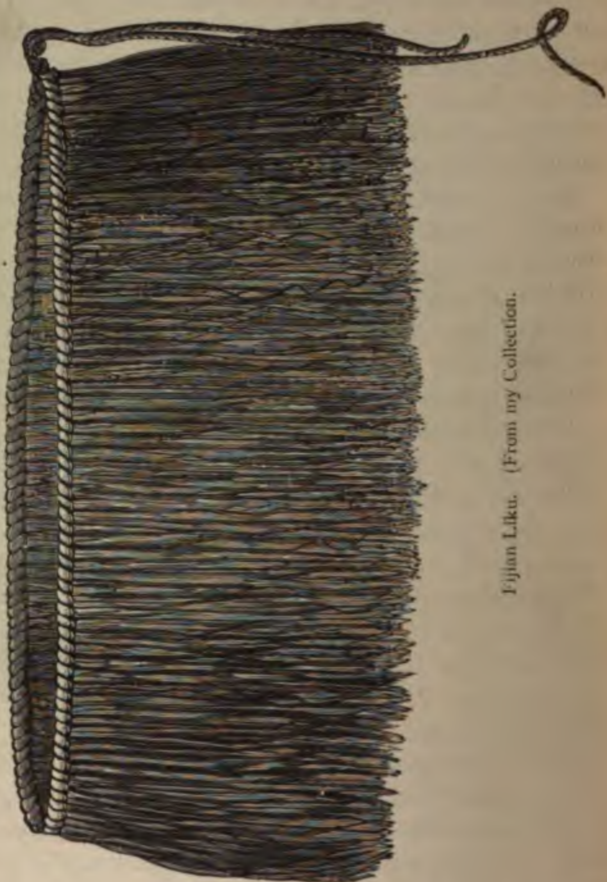
All that can be said is, that the liber is stripped rom the tree, soaked in water, and beaten out with mallets, much like gold-beaters' skin. There are as many differences of quality in bark cloth as there are between sack cloth and the gauzy fabric of a bride's veil. This, I am informed on feminine authority, is known by the name of "tulle," and is so fine that a lady can wear ninety yards of it by way of an evening dress.

The ladies of the Pacific Islands, however, do not wear the bark cloth, leaving that fabric for the men, and wear the thong apron. As this article of apparel assumes various forms, I will take the Fijian as the typical form.

It is called the "Liku," and is made of two kinds of material. The usual kind is that which is represented in the illustration, and is made of a species of hibiscus. The Fijians call it by the name of "vau," which is evidently identical with the "fow" of Tonga. See page 463.

The status of a woman is known at once by the

character of the liku which she wears. As long as she remains unmarried, her liku is scarcely more



Fijian Liku. (From my Collection.

than three inches in depth, and is intentionally too short to pass round the waist, so that a considerable

gap is left on one side, where the waistband is fastened.

When she marries, she exchanges this dress for a much larger liku, which completely encircles the body, and falls half-way to the knees. But when she attains to the dignity of motherhood, she is entitled to a much larger liku, which sometimes reaches even below the knees.

Should her father or husband be very fond of daughter or wife, he procures for her the fashionable liku, made of a vegetable parasite called "maloa." The liku vau is pale yellowish brown in colour, but the liku maloa is jetty black, the thongs being no thicker than ordinary twine, and having a natural glossy polish.

It requires much care on the part of the wearer, as the thongs are liable to become brittle, and to snap if they are bent.

AGAIN let us transport ourselves to another part of the world, and into a different climate, so as to find ourselves in a Japanese town during a snow-storm. It is rather startling to find in Japan a garment which is nothing more than a modification of the Fijian liku, and which is used in a cold instead of a hot climate.

This is the well-known Snow Cloak, of which there are several varieties, the best of which is represented in the illustration, a back view of a portion of it being given in order to show the mode of construction.

The groundwork of this cloak is a net-work, having meshes about two inches in diameter, and made large enough to envelope the whole body loosely. The portion that reaches from the neck to the shoulders is woven in a different manner, so as to act like the pent-house of a "sou'-wester" hat, and throw the rain or snow well off the shoulders. To each corner of each mesh is attached a bundle of

Japanese Snow Cloak. (From my Collection.)

long, flat, vegetable fibre. These bundles are tied tightly together at the upper ends, but radiate, brush-like, toward the tips.

The garment, therefore, although exceedingly light, is quite as effectual a preservative against rain as any of our waterproofs, and is much more pleasant to wear. The specimen which is here figured formed

part of my collection, and I often wore it in bad weather.

Returning to the South Pacific, and again visiting New Zealand, we find a garment which is a sort of compromise between the thong clothing of Africa, Guiana, and the tropical Pacific Islands, and the woven fabrics of Europe and Asia: this is the well-known cloak, or "mat," of the New Zealander. Of this garment there are many varieties; but, in order to give my readers a general idea of its appearance when worn, I present them on the next page with a portrait of Parâtené Maioha, the celebrated diplomatist and general, as he appeared when wrapped in his robe of state.

Again, the productions of the soil control the handiwork of man, and so the New Zealander has to depend for his clothing on a material unknown to any of the other Pacific Islanders.

New Zealand is deficient, like the other islands, in large mammals and brightly-plumaged birds. It is also deficient in the plants and trees of those islands which are placed nearer the Equator; but it possesses a plant of its own which is equal to the cotton of tropical America, or the hibiscus and paper-bark tree which are so valuable to the Fijians, Tongans, and the other inhabitants of the Southern Archipelago.

This plant is scientifically termed *Phormium tenax*, and is popularly known by the name of New Zealand Flax, though it has no connexion with the true flax, but belongs to a totally different tribe, being allied to the asparagus.

Parâtené Maioha in his State War Cloak.

Moreover, the tenacious fibres which make the flax so valuable are procured from the stem, while those of the Phormium are found in the leaf, which is swordlike in shape, some five or six feet in length, and about two inches in breadth at the widest part. The fibres run through the whole length of the leaf, like those of the silk-grass, which has already been described.

If the reader will refer to the portrait of Parâtené, he will see that, on the right-hand lower corner of the mat, the inside is shown. A glance at this portion of the mat will serve to explain the mode of making it.

Bone Needles.

I must here ask the reader to pause a while, and mentally return to pre-historic life.

We have already seen the awls of ancient and modern days, and will now turn to the needles.

Among the pre-historic relics are sundry articles, the object of which is evident at a glance, the presence of the eye showing that they were intended to carry a thread, and not to be used like the so-called "needles" of South Africa. This fact alone points to a different order of work, and the New Zealand mat, in the manufacture of which a similar instrument is used, affords a clue as to the kind of work for which it was intended.

One of these needles is now before me. It is

made of bone, and is six inches in length, curving slightly and regularly from eye to point. It is thickest in the middle, so that in this respect it resembles the sewing-machine needle for which a patent was taken out some years ago. It is rather a heavy instrument, being more than half an inch in thickness in the middle, but is exactly adapted for the

Old English Loom. (*See page* 500.)

object for which it was intended, *i.e.*, that of carrying the transverse threads, or woof, of the mat.

The process of matmaking is, briefly, as follows :—

A wooden frame, of the requisite size, is laid horizontally, and is held a foot or so from the ground by upright sticks, to which the frame is tightly lashed.

The next process is to lay the warp. This consists of a great number of phormium strings, placed parallel to each other, laid as closely together as possible, and drawn quite tightly.

Next comes the shooting of the woof or weft. It is for this purpose that the needle is required, its curved form enabling it to be passed under and over the warp with ease. Parallel lines are drawn across the warp at regular intervals of an inch or so, and the warp, which is double, is sewn tightly together over these lines, being fastened together by a peculiar stitch.

In order to make the weft lie closely and evenly, a flat wooden blade, like a very large paper-knife, is inserted between the warp-strings, and every stitch is beaten close with the edge. In the oldest form of English loom a similar instrument was employed, and was technically known as the "sword."

It is a remarkable fact that several of the tribes that inhabit the coasts of Australia make a cloak which in construction is exactly similar to the New Zealand mat.

As the reader may be aware, there is one flowering plant which inhabits the sea. This is the Zostera, or Sea-grass, the narrow blades of which grow to a great length, and are traversed by very strong fibres.

From this material the native twists a rough string, and then, laying a sufficient number of these cords parallel to each other, he lashes them together at regular intervals, just as is done by the New Zealander. In fact, there is such a resemblance

between the two mantles that an inexperienced person might well be excused for thinking that the Australian cloak had been made in New Zealand.

The Australian mantle-maker differs from his Maori brother in one respect. He only carries the cross-lashings as low as the knee, leaving all the ends of the strings loose. These soon become unravelled, and form a long fringe all round the lower edge.

The principle of the New Zealand mat-frame is, therefore, identical with that of the loom, the chief distinction being that in the loom the weft is continuous, while in the mat-frame it is only laid at intervals of an inch.

In order to make the analogy between the mat-frame and the loom more clear, as well as to show the progress of human invention, I have introduced on page 498 a figure of an old English hand-loom, such as was universal until the end of the last century. Here we see the warp-threads stretched almost horizontally, but slightly sloping for the sake of convenience. The shuttle containing the weft, and corresponding to the New Zealand needle, is in the weaver's left hand. She has just passed it between alternate threads of the warp, from left to right, and is holding it in her left hand, while in her right she is beating it tight with the "comb."

This instrument is a great advance upon the sword. The latter has to be inserted singly between the warp-threads, while the comb is made of a great number of swords set on a strong backing, and needs never be taken out of its place. So all the trouble of

inserting the sword separately is saved, while a single smart blow of the comb strikes all the weft at once, and has the additional advantage of laying it much more regularly.

The reader will see that there are two treadles, on one of which the weaver has her foot. This is another great saving of time.

In the New Zealand mat-frame the weft has to be laboriously darned under and over the warp-strings. This is not only a long and clumsy process, but, if the weaver should happen to miss a stitch, the fabric would be spoiled.

Now, if each alternate warp-string passed through a loop at the end of a cord attached to a horizontal bar, the act of raising the bar would raise the warp-threads so as to allow the shuttle to be thrown under them by a single movement, thus doing away with the darning process.

If a cord were attached to the bar, passed over a pulley, and then fastened to a treadle, the foot could do the work of the hand. All that remained would be to have the remaining threads attached in the same way to another set of strings, bar, pulley, and treadle, and then the loom would be complete.

Such a loom as this may be seen in Hogarth's well-known "Industrious Apprentice," and in my early boyhood I have seen numbers of them in Derbyshire. Wirksworth was full of such looms, and, while walking along the streets, the ceaseless clit-clatter, clit-clatter of the looms on either side of the street greatly impressed a stranger.

To return to the New Zealand mats.

They are made of different sizes and of various

Rain Mat.

qualities. Among them is the "rain mat," which very much resembles the snow cloak of Japan. Many of tnc mats are adorned with rows of little shining

cylinders some three inches in length, connected by string of the same length. These are made from the leaf of the phormium. The outer cuticle, or epidermis, is only removed at intervals, and the leaves are then rolled up into cylinders.

As the New Zealanders are in the habit of squatting on the ground, enveloped in these mats, which they gather tightly under the chin, they present a very remarkable, not to say grotesque, appearance.

The reader will probably have noticed that the mat which Parâtené is wearing is evidently fur—an apparent contradiction to the statement on page 495, that fur-bearing animals do not exist in New Zealand. The statement is perfectly true; but the English colonists have introduced horses, dogs, sheep, and pigs, and other animals, and the native chiefs have of late years invented a new kind of official cloak into which the hair of dogs is introduced with every stitch, so that, on the exterior, the cloak looks as if it were wholly made of fur.

I have described these mats at some length, because the English blanket is so much warmer and lighter, and can be obtained so cheaply, that it is superseding the characteristic mat, the manufacture of which will in a few years be extinct.

We now come to the manufacture of the thread, or string, which is used in these fabrics.

Thread-spinning has from time immemorial been an occupation especially fitted for female hands, as exemplified in the word "spinster" as synonymous with an unmarried female.

Nothing can be simpler than the prin

thread-spinning, and the elaborate machines of our modern factories do no more than imitate on a large scale the thread-spinner of pre-historic times. The principle is simply this: a quantity of fibre, either vegetable or animal, was repeatedly passed through combs so as to bring the fibres nearly parallel to each other and avoid entangling. These fibres were then fixed upon a forked stick, called a distaff, and the

Old English Distaff and Spindle.

thread was drawn out by the fingers, and twisted by means of a spindle-weight, as shown in the illustration.

Up to quite recent times, every lady had her distaff and spindle, and the reader may remember that, not many years ago, there were women still living who could boast that the whole of their household linen, including their under-garments, had not only been made by themselves, but that they had

grown the flax, prepared the fibres from it, spun the thread themselves, and woven the linen in their own looms.

Even when walking it was a point of honour to carry distaff and spindle, the handle of the former being stuck in the girdle.

The classic reader will here remember the story told by Herodotus, of the admiration excited by a young maiden, who walked to the river leading a horse by his bridle looped over her arm, and carrying a large jar on her head, and spinning as she walked. She went to the river, allowed the horse to drink, filled her jar, replaced it on her head, and returned as she had come, spinning as she walked.

No rank was exempt from spinning, and the distaff belonged equally to the queen and the peasant woman. As may be seen by her dress, the seated spinning lady is a possessor of both rank and wealth.

After a while an improvement was made, which enabled thread to be spun in greater quantities and of much more even quality than could be produced by the hand and spindle.

The distaff was fixed to a frame, so that the left hand was set at liberty, and the thread, instead of being pulled from the distaff by repeated and necessarily uneven movements of the arm, was drawn steadily from it by means of passing it round a wheel turned either by the foot or hand.

In the former case the spinner is seated, as seen in the illustration, and in the latter case she has to stand, and to turn the wheel with her hand. This wheel is of

very much greater size than that which is represented, and much more extension is required. The standing wheel is still used in spinning the woollen thread used in making the celebrated Welsh hose, no

Spinning-wheel.

machine being able to treat the delicate fibres without breaking them.

The spinning-wheel is now, except for the

purpose mentioned above, practically extinct in this country.

As to the process of spinning the thicker threads, which we call ropes, it has experienced so many and so important improvements, that a scene which is here shown is almost unintelligible to the young people of the present day. Yet there are persons still living who have seen cables made in our dockyards in precisely the same manner. Here one man carries a swivel attached to a belt, which goes around his

Rope-making. Ancient Egypt.

waist. To the side of the swivel is fastened at right angles a heavy weight at the end of a short bar. The seated man regulates the supply of material and amount of tension, while his companion walks backwards, leaning his body on the belt so as to stretch the cable, and whirling the weight round and round as he recedes, so as to twist the strands of the rope.

Some means of severing the thread or cutting the fabric had necessarily to be invented, and the

simplest plan was to take as a model the blacksmith's tongs, which are figured on page 438, forge the tips flat, and sharpen the edges on the inside.

This form of shears has existed unchanged up to the present day. With these shears the fabled Atropos is represented as cutting the thread of life, and with shears which might have served as a model for the illustration, we trim our grass-borders at the present day.

Iron Shears.

Before passing to another subject, I must revert to Guiana, and mention a singularly beautiful woman's dress, which does not come under either of the previous categories. Like the dog-fur mat of the New Zealander, it is quite of modern invention, inasmuch as no Guianan native ever made a bead. But it shows such artistic taste, and such ability in seizing upon new materials for native art, that I must give a short description of it.

The reader will remember that in the feather apron used for dances the fabric of the apron is first woven, and then the feathers sewn upon it. But in this apron the ornamentation forms an integral portion of the fabric.

These bead aprons, called by the name of Queyu, are made in an infinite variety of patterns, according to the materials obtainable by the native artist. In one case the woman could obtain only black and white beads, and has therefore woven them into the "Greek fret," which has already been mentioned.

In the present case the woman has been fortunate enough to procure about half a pound weight of little beads of various colours, together with a handful of larger beads of cut glass. There are transparent beads of carmine, blue, yellow, and green, and opaque beads of vermilion and chalk-white. Despite these brilliant hues, the pattern and colours are in such perfect harmony with each other, that there is nothing glaring about it, and the eye rests upon it with a sense of repose.

Want of space prohibits me from describing in full this beautiful specimen of native art, which requires the aid of colour in order to do justice to its many excellences. The daring which has been shown in some parts, where yellow has been placed next to green, is positively startling; but I imagine that the artist must have borrowed the idea from a yellow flower among green leaves. The late Mr. T. Baines, to whom I showed this example of native art, suggested that the Guianans probably owed their knowledge of colour harmonies to the brilliant plumage of the flamingos, macaws, humming-birds, and parrots, as well as to the gorgeous hues of the native butterflies.

The extreme length of this apron is eight inches, and its depth four inches.

The mode of working these aprons is rather intricate, and requires careful investigation before it can be discovered. Firstly, an oblong frame has been made and a kind of warp stretched upon it. This warp is made of cotton string, and the threads are placed just sufficiently apart to allow two beads to

Guianan Bead-apron. (From my Collection.)

be placed between them. The beads are not strung upon the warp, but on the weft, which is made of the fine but very strong fibres of the silk grass, and each bead is separately stitched, so that if one should happen to come off the others are not loosened.

If the reader will look at either end of the apron, he will see that these stout warp-threads only extend as far as the base of the loops by which the apron is suspended, the shape being up to that line a simple parallelogram. But to either end a triangular piece is added without warp-threads, and the result is that, when the apron is lifted by the loops, each of the triangular ends falls into graceful folds, while the parallelogram remains flat.

A line of the chalk-white beads runs round the edge of the apron, immediately below the strong cotton strings which form its border, and the maker has judiciously reserved the cut-glass beads as a sort of a fringe, their weight serving to keep the ornament in position. In order to prevent these from falling off, a coral bead is tied securely under them. In order to show this arrangement better, one of the beads is given of its full size.

CHAPTER XXXII.

PERSONAL ORNAMENTS.

PERSONAL ORNAMENTS.—Trophies of courage and skill—Scalp of the North-American Indian—Hunter's necklaces and bracelets—Zulu Leopard-tooth necklace and its copy in metal—Boar's-tusk bracelet—Pre-historic Wolf-tooth and Boar-tusk ornaments—Ornamental Head-dresses—The feather head-dresses of Guiana and the Marquesas—Porcupine-quill head-dress of the Bechuanans—Masks—Priests' masks of ancient Egypt and Assyria—Stone masks of ancient Mexico—Aht masks—The double mask—The Beaver mask—Mumbo-Jumbo—Sandwich Island masks—The "So" and "Buffalo" masks—Combs—The tattoo—New Zealand tattoo—The "moko"—Marquesan tattooing—Tattooed Europeans—The tattoo and the photograph.

THE most honourable kind of ornament is not that which appeals to the eye by cost of material or splendour of colour, but that which is a proof of courage, skill, and endurance, whether these qualities be employed against man or beast.

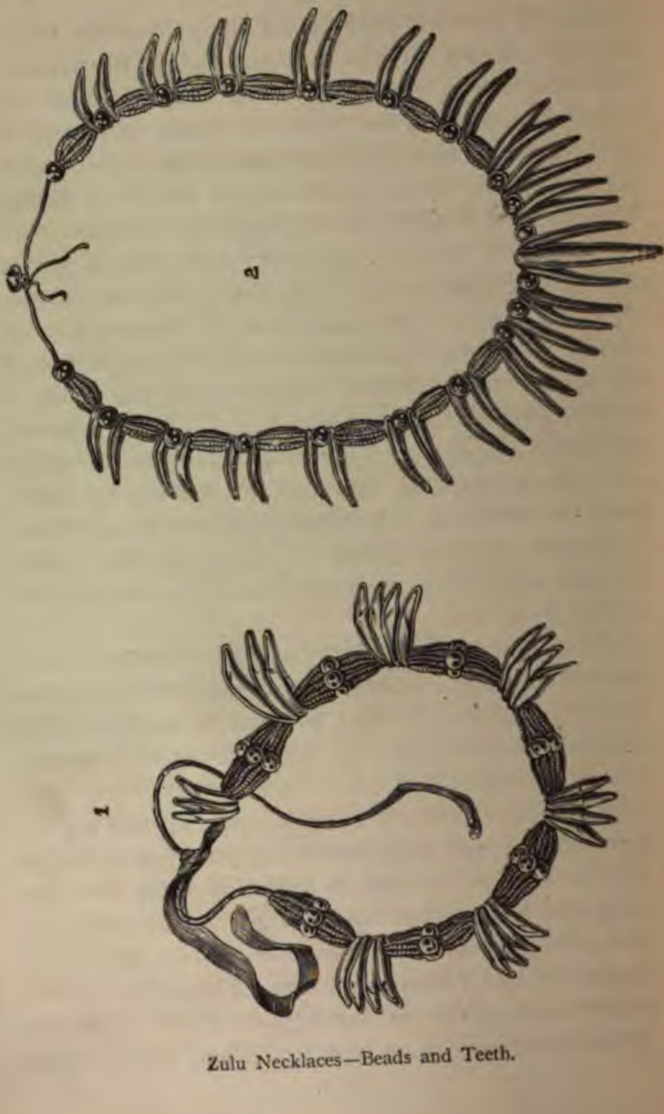
The reader may remember that a Zulu hunter, who can wear necklaces and bracelets of leopard's teeth and claws, and who makes his apron of leopard tails instead of mere strips of monkey-skins, is held to be a very great man among his own people. He may not wear that garment unless he has killed the former owners of those teeth and tails without assistance.

One of these highly-prized leopard-tooth necklaces is shown in the accompanying illustration. The necklace is constructed with some idea of art. It will be seen that the teeth are strung in groups of either three or four, and that each group is separated from the next by a spindle-shaped cluster of beads. The mode of making the necklace is as follows.

The maker has first cut seven very thin strips of raw hide, rather more than three feet in length. First, he has strung upon each of them a row of small black glass beads about an inch and a half in length, and has then slipped upon the string a large white bead spotted with blue. Then, gathering the seven strings, and twisting them into a single cord, he has passed the cord through the apertures bored in the teeth. Then comes another bead-cluster, and then another group of teeth, so that, when finished, the necklace assumes the appearance shown in the illustration.

The second Kafir necklace is rather an interesting one. It evidently belonged to a man who could not kill leopards, but wanted to wear a necklace that would make him look at a distance as if he were a leopard-hunter.

He was, however, clever with his hands and a good metal-worker, and with much ingenuity contrived to make a set of brass teeth in imitation of the veritable fangs, and has strung them together in the orthodox fashion? By way of a telling pendant for the centre, he has cut out of bone an enormous model of a lion's tooth, and hung it in the centre of the ornament. All the brass teeth were highly polished, and sparkled



Zulu Necklaces—Beads and Teeth.

so brightly in the sunshine against the black skin of the wearer, that the man was a conspicuous object at a very long distance.

Similarly, the North-American Indian, fond as he is of personal adornment, attaches no real value to any ornament which is not at the same time a trophy. Every eagle feather in his head-dress signifies an enemy killed in fair fight, and every streak of red paint on his skin marks the scar of an honourable wound.

Of all trophies, the scalp is, as we know, the most highly valued. Though often nothing more than a circular piece of dried skin not two inches in diameter, and having a tuft of long black hair hanging from it, the scalp is valued as highly by the American Indian as is the Victoria Cross by our own countrymen.

Almost, if not quite equal to the scalp, is the necklace made from the teeth and claws of the full-grown grizzly bear, while a man who can show both scalps and bear-claws is supposed to have attained the highest point to which ambition can aspire. Such a necklace cannot be purchased. It can only be obtained by killing the animal without assistance, or slaying in fair fight a warrior of a hostile tribe who possesses the coveted decoration. In that case the victor is entitled to place another eagle's feather in his head-dress, and to appropriate and wear the scalp and necklace of the vanquished.

A similar custom prevails in India, and as an example I here give a figure of a hunter's necklace, composed of spoils taken from the tiger, sloth-bear, and crocodile.

At Fig. 1 is seen a claw taken from the fore paw of a tiger. Such claws, especially when large like the present example, are often mounted in gold and worn separately.

Fig. 9 represents a hind claw. One of the upper canine teeth or fangs of a large tiger, probably the same animal, is shown at Fig. 5. This fine tooth is five inches and a half in length, and at the thickest part measures a little more than three inches in circumference.

Figs. 4 and 6 are claws of the sloth bear, an animal which not only grows to a large size and is then very ferocious, but is singularly tenacious of life often maiming or even killing a hunter who incautiously approaches it, thinking it to be dead. The re-

Hunter's Necklace Separated,

Necklace as worn.

Necklace of above.

maining teeth, with their hollow bases, are those of the crocodile, and were probably added to the necklace as records of some remarkable adventure.

Fig. 10 shows the necklace as it appeared when the teeth and claws were strung. The artist, however, in replacing them on the string whence I took them, so that they might be separately drawn, has set the right-hand tooth with its point directed inwards instead of outwards.

The remarkable bracelet which is here figured was brought from the Sandwich Islands, and is probably a trophy of skill and courage as well as an ornament. Killing a wild boar single-handed is a difficult and a perilous task, and a man who has killed ten of these animals has a good right to wear their tusks as a bracelet. Having been suffered to run loose in the woods since they were first imported, the swine of these islands have become as fierce, and active, and tenacious of life as any of their progenitors of the old world. Moreover, their hides are so thick that the ordinary native spear

Bracelet of Boars' Tusks—Sandwich Islands.
(From the United Service Museum.)

Wolf Canine Tooth.

cannot penetrate them, while their strength, ferocity, and determination render them terrible foes.

One of these beasts had received two rifle bullets in the shoulder, but was not in the least daunted, though almost any animal except a wild boar would have been disabled, if not killed. He flew at his foes with unabated ferocity, and did not succumb until he had received a hatchet cut over his neck and a knife in his throat.

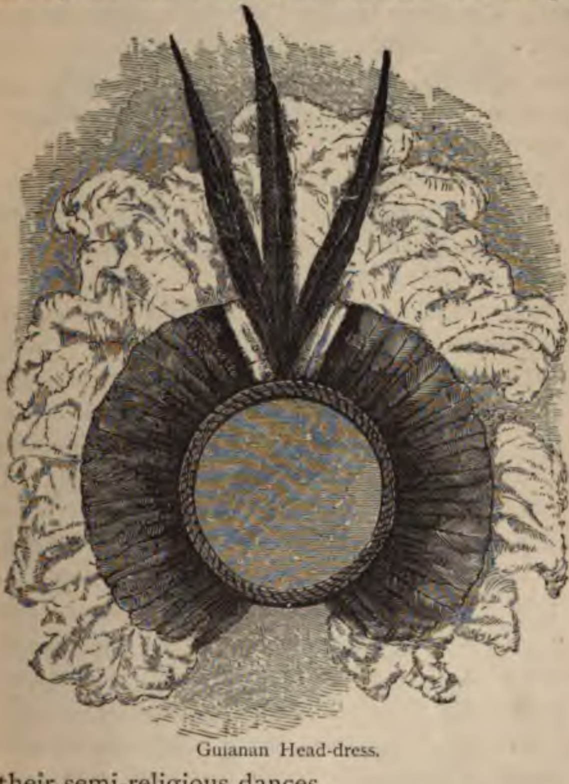
Necklace made of split Boar-tusks.

That pre-historic man decorated himself with the trophies of the chase is evident from sundry relics. One of these, which is the canine tooth of a wolf, is pierced in exactly the same manner as those which have been already figured, and undoubtedly formed part of a hunter's necklace.

We may compare the boar-tusk bracelet with a very remarkable ornament of pre-historic times. Having killed some boars, the ancient hunter has determined to make the most of them. So he has split them longitudinally, bored a hole at each end, and strung them as seen in the figure.

THE varieties of ornamental head-dresses is so great that I am obliged to restrict myself to three examples.

The first is a ceremonial head-dress, which is made by the Macoushi tribe of Guiana, and is used



Guianan Head-dress.

in their semi-religious dances.

The reader will remember that this is the tribe which is so celebrated for the excellence of its wourali poison, and which was such a favourite with Waterton.

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Marquesan Chief.

tion of this ornament is cut out of a light wood, and upon it are set a vast number of the well-known scarlet and black berries of the *Abrus precatorius*. As these berries, when dried, are of almost the same weight, they are much used in the East by jewellers when buying or selling gold-dust.

The berries are stuck to the wood by means of a dark wax, and, as the black portion is always downwards, only the scarlet can be seen.

Bechuanan Dancing-cap.

One of these ornaments, which formed part of my collection, measured eight inches in diameter, and had between eight and nine hundred berries in it.

All nations have their peculiar dances, and, as a rule, a special costume is worn on these occasions. The "ball-dress" of the present day is nothing but a

civilised survival of the gorgeous dresses of savage life transferred from the men to the women.

South Africa is scarcely the locality where we might expect to find a really artistic head-dress formed of unpromising material, and yet, among the Bechuana tribes, we find the singularly graceful head-dress which is here figured. But it must be remembered that the Bechuanas possess the true artistic spirit, as is exemplified by the knife handles and sheaths, which have been described and figured, as well as by the bold and striking forms of their fur mantles.

As can be seen at a glance, this cap is made of the quills of the porcupine, set in a leathern circlet. Suppose that the entire skin of a porcupine and a leathern circlet were given to a Zulu, a Pondo, a Kosa, or other South African native, and he were told to make a dancing-cap, he would be certain to choose the stoutest and straightest quills, and to set them upright, so as to be as imposing as possible. But the Bechuanan knows better. He rejects the straight quills, selecting only the long and slight quills which bend from the shoulders over the back. These he sets in a slanting direction, so as to present the appearance shown in the illustration.

In dancing, the wearer contrives to manage his head so as to cause the quills to wave gently in the air, and produce a striking play of colour as the light falls upon the alternate white and black bands with which these quills are marked.

The dancers also carry in their hands a remarkable instrument called a "jackal." It is made by cutting off the tails of three or four jackals, slipping

the skins off the tails, and slipping them on a black and polished stick about four feet long.

It looks like a gigantic fox-brush, and is used as a pocket-handkerchief to wipe the face withal. It also does duty as a fan, and is, besides, waved gracefully in the air in accordance with the measured movements of the dancers. A great chief will sometimes have his "jackal" made of ostrich plumes. The Bechuanan name for this instrument is Kaval-klusi or Kaval-pukoli, one being made of the black-backed jackal, and the other of the yellow species.

ANOTHER variation in the head-dress is that which covers the entire head and face, and one popularly known as Masks: and it is a notable fact that, from time immemorial, the Mask has taken an important part in religious ceremonial.

Those who are familiar with the ancient Egyptian and Assyrian monuments must remember that the priests of different deities wore masks as part of their official dress. We see, for example, priests with the head of the ibis, or the vulture, or the baboon, and, in many instances, a pair of large artificial wings may be found as part of the official costume. Stone masks, in some cases most elaborately covered with jewels, were worn by the ancient Mexican priests, and at the present time the various Aht tribes of British Columbia employ for the same purpose masks which have a distinctly Mexican character.

The mask of which two views are here given is in the British Museum, and is really a wonderful piece

handiwork by demi-savages. Not only is it a ly hideous mask, but it is so constructed that, by

Aht Mask. (From the Christy Collection.)

ing certain strings, the eyes can be made to roll, the jaw to work up and down.

There is a still more wonderful mask in the Maidstone Museum. It possesses singularly hideous features, but that is not all. It is not cut out of a solid piece of wood, but is made in four parts, a perpendicular dividing line running from the forehead down the centre of the nose to the chin, and a transverse line from cheek to cheek. These pieces fit so closely that they escape observation at a little distance. Suddenly the dancer pulls a string, and all the four parts fly back on hinges, showing a second mask below the first.

Beaver Mask of the Aht Tribe.
(From my Collection.)

Another of these masks is shown in the accompanying illustration, and is evidently meant to represent the head of a beaver. When trying it on, I was much struck with the ingenuity with which the holes in the eyes had been bored, so as to allow the wearer to see. The wood is rather thick, and, if the holes had been bored horizontally, he could only have seen objects some five feet or more from the ground. But the maker of the mask has foreseen this difficulty,

and has given exactly the slight slope which was needed.

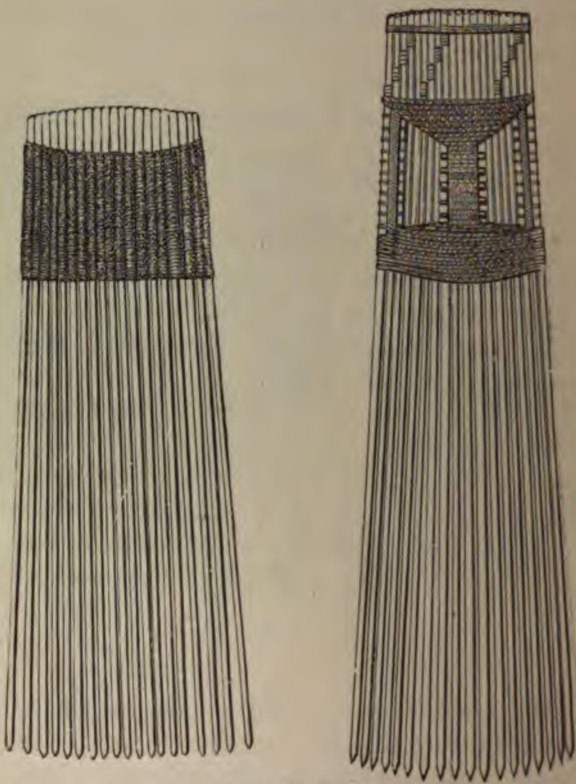
Many other forms of mask are used in different parts of the uncivilised world. For example, there is the famous mask of Mumbo-Jumbo, which, with its accompanying cloak of bark, is donned whenever the natives find their wives getting the upper hand, and becomes the medium through which a severe flogging is administered.

The Sandwich Islanders amuse themselves by a sort of masquerade in canoes. The masks are made of gourds with holes for the eyes and nostrils, the mask looking much like a diver's helmet. A bunch of green twigs on the top does duty for a plume, and a false beard made of strips of bark cloth descends nearly as low as the knees.

In Dahomè, one of the terrible "customs" ceremonies is a dance performed by a man who personates the demon "So," and who is disguised in a huge mask like a bull's head. The North-American Indians, in their "Buffalo Dance," similarly disguise themselves in masks made from the head of the bison.

COMBS are of very ancient origin, and it is not difficult to trace their gradual development. Savages, or even partially-civilised mankind, have a constant desire to scratch their heads, and are generally furnished with an instrument for this purpose. When the hair is thick, woolly, and radiating from the head, as we see in the Fijians and Papuan race generally,

in the various South African tribes, the Arabs of the Soudan, &c., a skewer of wood or bone is usually stuck into the hair and kept for that purpose.



Fijian Combs.

But, in cases where the hair is comparatively straight and needs to be kept in order, a single skewer is insufficient for the purpose, and so the

simple plan was adopted of tying a number of skewers in a row.

Examples of such combs may be found even in Fiji, where they are used by the priests as symbols of their rank. As to using them in European fashion, it would be impossible. In many cases, the lashing which fastens the teeth of the comb together is of the most elaborate description, and might arouse envy in the hearts of our most experienced seamen.

New Caledonian Comb.

Bone Comb.

Bronze Comb.

A comb, which is identical in principle with that of Fiji, but which is used for the arrangement of the hair, is to be found in New Caledonia.

The next figure represents a pre-historic comb cut out of a single piece of flat bone.

Here we have a distinct improvement on the clumsy plan of tying a number of flat slips of wood

together. Still, as in those times there were no tools which could cut teeth of any delicacy or to any considerable depth, it would be necessary, when a long-toothed comb was required, to revert to the ancient practice. The reader will notice the peculiar handle of this instrument, which looks as if the owner intended to rake his head rather than comb it.

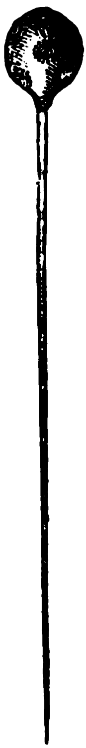
The last figure shows a comb which would pass muster at the present day, both for practical effectiveness and for artistic design. Being of bronze, it must have been cast in one piece, and considering that in the Bronze Age the use of fine sand as moulds was unknown, and that each mould had to be cut out of two pieces of stone, this implement reflects the highest credit on its maker.

As to miscellaneous articles of the toilet, they are too many even for enumeration, and I shall only mention one of them.

Supposing that these pre-historic people wove cloaks for themselves, like the mats which are still worn by the New Zealanders, they would naturally wish for some means of fastening them together in front, and might use for that purpose a long thorn if a suitable specimen could be found, or a small wooden skewer such as could easily be cut.

This extemporised fastener would soon give place to a stronger and sharper pin made of bone scraped to a point, and that again would be superseded by a pin of metal. An enlarged head, to prevent it from slipping through the fabric was an obvious improvement, and so we find that the long large-headed pin

of the present day had its prototype in long past ages. A pin, such as is here represented, would be a valuable article of property, and so its head was thought worthy of decoration such as may be seen in the illustration. If we examine the many antique pins which are to be seen in various museums, we shall find that the art which was lavished on some of these implements was of the highest character, and that the most fashionable lady of the present day might be proud of wearing a pin which was old when Abraham was born.


Bronze Pin.

WE now pass to that mode of decorating the skin with indelible marks which is called "tattooing," the name being evidently derived from the sound produced by the tools of the operator. The custom prevails throughout Polynesia, and as a work of art reaches its highest development among the Marquesans. But the New Zealanders fall little short of them in this respect, and, though their tattooing occupies less extent of surface than among the Marquesans, it possesses a bold characteristic of its own.

The principal tattooing is that of the face, and is called by the name of Moko, and, although there are certain principal patterns which are almost identical in every moko, there are many variation which are, so to speak, the coat of arms of the wea

For example, every moko has the curved and radiating lines on the forehead, the parenthesis-like lines coming from the nostrils to the chin, and passing round the corners of the mouth, the large spiral on the cheek-bone, and the smaller spiral below it.

New Zealand Tattoo.

Each of these departments of the moko has its own name.

One of the best examples of the moko is afforded by the face of Te Whaio, the New Zealand Ariki, or

Head Chief, who visited England in 1884. He was popularly designated the Maori King, but there is no such rank, his true designation being that which I have mentioned.

A very good photograph of this chief is now before me, and shows, as well as a photograph is able to show, the intricacies of the pattern.

My readers are probably aware of two facts, the one being that the marks of the tattoo are blue, and the other that in a photograph blue becomes nearly white, or, rather, does not show at all, just as yellow becomes black and shows too much. In the New Zealander, however, the pattern is not merely apparent under the skin, but is cut deeply through the skin, leaving scars which never disappear. Light and shade, therefore, reproduce the moko lines in a Maori, while the same patterns would produce no effect on the plate if they had been merely pricked into the skin.

Tattooing Implements. Tahiti.

Although used in a different manner, the tattooing tools are practically the same, whether in New Zealand, Tahiti, Samoa, or the Marquesas. They consist of little adzes made of bone, and having their edges scraped extremely sharp, and cut into teeth as here represented. These instruments are popularly called chisels, and will be so termed in the following

description. We will first see how these instruments are used in producing the moko, and will assume that the operation is to be performed on the face of a very great chief, such as Te Whaio.

In the first place, the operators are all professionals, and their different degrees of skill are as well known as the abilities of painters among ourselves. The most eminent moko artists can command their own price for the operation, and well may they do so, for even a slight prick from one of the teeth of the chisel is indelible, so that the smallest mistake on the part of the operator will disfigure a man for life.

These moko artists attain their skill by practising on the faces of men who hold a rank sufficiently high to entitle them to the moko, but cannot afford to pay an operator. Even the first attempts of a student in the art are better than no moko at all, and so both parties are pleased.

The first business is to design the moko, show his drawing to the young chief, and obtain his sanction. It is no easy task to draw a moko such as a nobleman ought to possess. The lines must not only be truly drawn, and harmonious in effect, but must be unlike those of any other moko.

The pattern being settled, the patient—as we may well call him, considering the pain which he has to suffer—lies on his back, with his head held firmly between the operator's knees. The artist, who has supplied himself with a little brush, like that of the "sable" of a miniature painter, a thin paste of pounded charcoal and water, traces with the utmost care and in very fine lines the amount of moko which

it will be safe to execute at one operation. Only a few inches can be completed at a time, on account of the swelling and inflammation which are always the result of the tattoo.

Next, with a fine and sharp point, he scratches the lines of the pattern into the skin. This precaution is necessary, because the blood that issues from the wounds must constantly be wiped away, and so would obliterate the lines of the pattern.

This being done, he takes a suitable chisel between the fingers of his left hand and a little mallet in the right, adjusts the edge of the chisel to the line, and drives it through the skin with a tap from his mallet. When he has cut a line of two or three inches in length, the blood is wiped away by an assistant, or apprentice, as we may call him, and with the brush the artist fills the wound with the charcoal paste. In like manner he proceeds with his work, each line not being merely punctured, but actually cut deeply into the skin, so as to leave a permanent groove.

It is incumbent on the patient not to betray the slightest sense of the torture which is being inflicted on him, and when the moko is finally completed he has established his right to be ranked among the men. The operation is a very long one, as so little can be done at each instalment, and so much time must elapse before the inflammation and swelling have subsided, so as to allow another section of the pattern to be drawn.

Beside the moko, the Maori warrior must have his body tattooed in similar fashion from the waist downwards, about half way to the knee, so that at a

little distance a man looks as if he wore a closely-fitting bathing-dress.

THE tattooing of the Marquesans, though far more elaborate than that of New Zealand, and occupying a much greater space, is not of the savage character which distinguishes the moko. The chisel does not cut continuous grooves, but is only driven into the skin as far as the points extend, so that the pattern consists of innumerable dots. As may be seen from the portrait of a Marquesan chief, there is scarcely an inch of skin from the crown of the head to the tips of the fingers and toes that is not tattooed. The eyelids escape because there is no mode

Marquesan Chief.

of tattooing them without damaging the eyes, and so fearful is the Marquesan of wasting the least portion of skin that can be tattooed, that he shaves the whole of his head except a little tuft on either side, and covers not only his face but his head with the tattoo marks.

I have already mentioned that the moko of the Maori has certain portions common to all the patterns. The effect upon European eyes of this uniformity is to make one Maori gentleman look so like another, that it is for a time very difficult to distinguish between them.

But the Marquesan is liable to no such conventional restrictions, and his whole body is a blank canvas on which he may paint any figures that please him.

In front, the body is mostly covered with a variety of patterns, such as are seen in the portrait, and a few grotesque human faces are mostly disposed upon the legs. But, whatever may be the variety of the patterns, they are all harmonious, and produce a pleasing general effect. It is, however, the back on which the Marquesan artist allows his fancy to have full play, and he mostly occupies it with diverse treatment of a single subject.

In these patterns the artist always respects the lines of the human body. Some dark and closely-tattooed pattern always runs along the spine, and another encircles the body just above the hips, so as to look like a floriated cross. There is generally a bold dark spot on each shoulder-blade, which forms the central spot of a circular or oval ornament.

In order to show the minuteness of the Marquesan

tattooing, and the manner in which it extends even to the tips of the fingers, I have given a figure of the hand of a chief. The reader will probably have noticed the length of the nails, which may almost be termed claws. Among the Marquesans, as among the Chinese, long nails are considered as a sign of

Hand of Marquesan Chief.

rank, being a proof that the possessor is not obliged to do any manual labour.

This elaborate tattooing has the effect of making a man look as if he wore a tightly-fitting and richly-embroidered dress, and, in consequence, he wears nothing except the slight girdle which seems common

to all the dark races of the world. That a chief, conscious of his imposing exterior, should endure such garments as are shown on page 521, is therefore really wonderful.

The complete suit of tattoo belongs only to the men, the women having much fairer skins, which they shelter as much as possible, and being only tattooed on the hands, feet, and waists, so that they look as if they were wearing gloves, belts, and boots.

This semblance of clothing is even more notable upon white than dark skins, the former showing the blue tint of the tattoo much more clearly.

In the United States there has recently sprung up an institution called a "Dime Museum," because the price of admission is one dime, *i.e.*, ten cents.

The chief point of attraction in these so-called museums is the exhibition of natural curiosities, such as giants, dwarfs, abnormal beings, such as the "Two-headed Nightingale," the "Three-legged Man," Zulus, Earthmen, Cingalese, and so forth.

Lately, tattooed men and women have been very popular, the fashion having been set a few years ago by a man who called himself Captain Costentenus, and who had employed some skilful operator, probably a sailor, to cover his whole body and face with tattooed monkeys, giraffes, elephants, snakes, birds, insects, &c. He then exhibited himself, and told a wondrous tale of his sojourn in Chinese Tartary, where he was detected in a conspiracy against the Emperor, and tattooed as a punishment.

Finding that Captain Costentenus prospered, others followed his example, two of whom I saw. One of

them, a young woman of about twenty-three, was covered with tattooing as much as the Marquesan chief, the patterns being in blue, and the background in red. At the distance of a few yards she looked exactly like a tight-hosed page of the middle ages, the tattooing having exactly the appearance of silk.

A photograph of this young woman is now before me, and is a complete failure, through no fault of the photographer. As I have already mentioned, the blue which forms the pattern makes scarcely any impression in the photograph, while the red becomes a soft grey. The only portion which gives any idea of the real appearance of the tattoo is the upper part of the left arm, which happens to be in a half-shadow.

In like manner, even in the portrait of Te Whaio, the pattern of the moko can hardly be seen at all on the forehead, which is in full light. To the eye tattooing looks black upon a brown skin, but it is in reality a very dark blue, and therefore is scarcely visible in a photograph. If our Marquesan chief were photographed, he would look almost like a white man with a few lines pencilled faintly upon the skin.

CHAPTER XXXIII.

POTTERY.

Perpetuation of a name—John Tomkins—Origin of Pottery—Pre-historic earthenware—Vessel and holder—An ornamental vase—South African potters—Building up an earthen jar—Guianan pottery—The twin water-bottles—The potter's wheel—Its primitive and present forms—The potter of Scripture—Jeremiah's metaphor—Clay in the potter's hand—Ancient Egyptian potters—The furnace, kiln, or oven.

IT has been said that any one who wishes for an immortal name can obtain it at a very easy rate. He need not be a great monarch or even a statesman. He need not be at the head of vast legions, destroy old dynasties and set up new ones. He need not build vast edifices which the hand of Time seems unable to destroy. He need not be a great author and write works which for a few thousand years are pronounced to be immortal. All these things have been done by men whose names have perished.

All that he need do is to expend a small sum—say from fifty to a hundred pounds—in ordering a number of china plates and basins with his name, country, and date stamped upon them, distribute them widely, and he may be sure of an immortal name.

The plates and basins will in time go the way of

all china. They will be broken by careless servants, and the fragments thrown away. The pieces will be used among other rubbish as the foundations of new houses. The houses will fall, and, following the way of all buildings, will in process of time be covered with accumulated earth, upon which, maybe, other buildings will be erected.

But the broken pieces of china stamped with the name of John Tomkins will remain unchanged beneath the soil, and in a future age, when we shall be to the then inhabitants of the earth as the palæolithic men are to us, excavations will be made, and the name of John Tomkins, London, 1885, will survive, and be recorded in history as that of the one hero whose noble name was honoured throughout the land.

In this work I do not intend to say anything about the many varieties of porcelain, of their beauties, merits, or demerits. I shall only give a slight sketch of the development of earthenware from the earliest time of which we have any record.

When the first earthenware vessel was made we cannot tell, and that its discovery was limited to one spot is incredible. There can be no doubt that in all lands the invention of earthenware was at first accidental, and that man, seeing the effect of fire upon clay, would begin to make rude vessels of clay, bake them in the open fire, and would by degrees improve, by successive failures, on his handiwork, until he could produce the exquisite porcelain of the present time.

For example, suppose we look at the cassareep bowl, which is figured on page 455, and consider the

domestic economy of the people who made it, we can have little difficulty in tracing the course of its manufacture.

The reader will remember that, in consequence of the climate, which floods vast districts with water, the natives are compelled to make their dwellings on platforms fastened to the trunks of trees or piles. They need fire for the purpose of cooking their food, and for this purpose they make a sort of hearth of damp clay upon the wooden floor. It is impossible

Earthen Vessel.

Earthen Vessel and Holder.

that the effects of fire on clay could go long unobserved, and the process of making earthenware would naturally follow.

The cassareep pot is, I have already stated, clumsy, thick, soft, and porous, these characteristics exactly fitting it for its object. It is, however, extremely fragile, and to all appearances is scarcely better than the earliest specimens of pre-historic pottery.

In the illustrations given above we have an

example of the handiwork of the pre-historic potter, who has certainly turned out a better piece of work than the cassareep pot of his Guianan successor. The reader will probably have noticed the peculiar form of the jar, and wondered how it could stand upright. The next figure, however, will explain the problem, a sort of hollowed stand being made for the jar, into which the conical bottom might fit.

The classical reader will be reminded by this jar of the amphoræ of the ancient Greeks and Romans, and the manner in which the full amphoræ were partly let into the ground, so as to keep them upright.

Ornamental Vase.

As an example of the imperishable character of earthenware, I have given a figure of a vase which really shows a wonderful amount of skill, seeing that the potters of those days did not possess the wheel, and that therefore the eye of the workman was the only guide.

In all probability, the ancient potter had no tools except those which he could fashion out of sticks, but yet he was able to produce this really admirable piece of workmanship. Feeble as must have been the furnace in which it was burned, or "fired" as

we may say, and fragile as was the vessel, the fragments survived the lapse of untold centuries as testimonies to the skill of the pre-historic potter.

As to the method employed by these potters of old times, we can again make the present a key to the past, and, by watching the proceedings of the least skilful potters of the present day, we can form a fair conjecture as to the past.

It is a remarkable fact that the Zulu, who is in many points the superior of the neighbouring tribes, should have remained almost stationary in art and manufacturing skill. The rigid and exacting military discipline under which a Zulu lives may have something to do with this unexpected inferiority, as leaving a young man no time in which to acquire the arts of peace.

Be this as it may, we find the Zulus to be almost the worst potters in South Africa. As we have seen, they can make wonderfully good baskets, but, when they have to make a common pot or pan, they are arrant bunglers.

Suppose, for example, that a large pot is wanted, such as is used for the preparation of the porridge, which has been mentioned on page 468. The potter, who is always a woman, sets about her task as follows. Her first step is to send an assistant to find a deserted termite's nest, to carry off a sufficient quantity of material for the work, and then pound it with water until it forms a tenacious clay, such as is used for the flooring of their huts.

Her next step is to take some of the clay, and knead it into a sort of flat saucer, which will form the

Zulu Potters.

bottom of the future pot. She next takes another lump of clay, rolling it between her hands until it looks like a long sausage, and then coiling it into a circle over the edges of the saucer. Another clay sausage is then added, water being used so as to make the junction perfect, and so the woman proceeds, adding ring after ring, and so building up the vessel by degrees.

Very little of this work can be done at a time, as the clay is apt to yield if too much weight be laid upon it. Even if the woman should succeed in completing the jar, it is sure to give way in the firing, certainly becoming lop-sided, or even splitting here and there with the heat. One of these mis-shapen and cracked pots may be seen on the right hand of the illustration.

As to elegance of shape, no Zulu potter ever troubles herself about it, and as long as a pot is large enough to hold a goodly supply of porridge or meat, and strong enough to withstand the action of the fire, she is perfectly satisfied.

In the illustration, the chief potter is seen in the act of finishing a vessel by scraping it with a piece of wood. By her side may be seen vessels in different stages of progress, and opposite sits her assistant, who is making the clay rolls, and moistening them with water from the bowl which stands by her side.

Now, the Guianans have no better tools than the Zulu, while their clay is scarcely as good. Yet, they can not only make such simple vessels as the cassareep pot, but can mould and bake a really elegant vessel. Examination shows that the upper and under

The stoppers o
of clay as well a
probably have no

Guianan Twin B

upon this vase, and
the "Greek fret," wh

antiquity. Allusion is frequently made to it in the Scriptures, and the wheel is frequently depicted upon those ancient Egyptian monuments to which we are so much indebted. Conventional as the artist was obliged to be, he has depicted the whole process of pottery with astonishing vigour and fidelity, hitting off the workman's gestures to the life. Nothing can be more true to life than the attitude of one potter who is raising a lump of clay in both hands, so as to fling it on the stone with true professional knack. Equally true to life is a potter who is "throwing" a cup upon the wheel, his hands stained with clay above the wrists, and his wrist and elbow uplifted, while with his thumb he is fashioning the interior of the revolving cup.

It may perhaps be necessary to mention that the potter's wheel is a horizontal disc, which is made to revolve, and upon the centre of which the clay is placed. The whole of the actual labour of moulding is, therefore, done by the wheel, the shape of the vessel being regulated by the pressure of the workman's fingers.

Thus, as in turning, a perfect regularity of outline is insured; the slightly uneven plates, cups, and saucers which we sometimes see, were perfectly true in outline when taken off the wheel, but have given way in the firing.

These imperfect vessels never pass into the manufacturers' warehouses, but are bought up for a trifle by speculators, and mostly distributed by street hawkers.

The original potter's wheel was probably that form

which is still retained in the East. Below the wheel on which the clay is placed there is another wheel made of stone, and very thick and heavy. The bare feet of the workmen are applied to the lower wheel and keep it in motion, so that both hands of the workman are set free.

When greater rapidity of movement was required, it was obtained by employing an assistant to turn

Potter's Wheel.

the wheel by means of a secondary wheel and bands, and this plan was universal until quite late years. Then people began to think that human beings were intended for something better than turning a wheel, and so at last the aid of machinery was invoked.

The illustration represents a compartment of a china manufactory of the present day.

The workman is fashioning a small bowl upon the

wheel, which is turned by means of the double strap that passes upwards and is connected with the machinery which turns the wheels of the whole manufactory. By means of a treadle and the upright disc in front of his foot, he can regulate the speed of the wheel, or stop it altogether. The wheel is sunk in a sort of basin for the sake of protecting the workman from the wet clay fragments which are thrown off as the wheel revolves. Even in spite of this precaution, everything near the wheel is spattered more or less with clay, and when the visitor leaves the factory a vigorous application of the clothes-brush is required before appearing in public.

The work of the assistant is thus much lightened, and, instead of perpetually turning a wheel, all she has to do is to bring the prepared clay to the workman, and take from him the completed vessel. Still, with all its adjuncts, the potter's wheel is essentially what it was many centuries before Jeremiah wrote his splendid image of the potter's wheel.

"The vessel that he made of clay was marred in the hand of the potter: so he made it again another vessel, as it seemed good to the potter to make it.

"Then the word of the Lord came to me saying,

"O house of Israel, cannot I do with you as this potter? saith the Lord. Behold, as the clay is in the potter's hand, so are ye in mine hand, O house of Israel" (Jer. xviii. 4–6).

Some little time ago, while inspecting one of our largest china manufactories, I was greatly struck by the aptness of the image.

fire. This may answer well enough for ordinary pots and pans which are not required to withstand much strain, but the heat is neither strong nor steady enough to produce the finer kinds of ware. Just as is the case with smelting metal, the heat must not be wasted in the open air, but must be confined within a boundary, and not allowed to pass away until it has done its work.

Furnaces, therefore, were made in such a form that a powerful draught of air was made to enter at the bottom and drive the flames upwards through the material on which they were intended to act. A good example of these ancient furnaces, or ovens as we now call them, is found among the ancient Egyptian sculptures, to which so many references have been made. In one of the pottery scenes depicted by the artist who lived under the Pharaohs, the process of "firing" is represented so faithfully that, with a few alterations of dress and comparative dimensions, the scene might be transferred to Worcestershire or Staffordshire at the present day.

On the left hand is seen the oven, with the flames issuing from its top, showing that the vessels within it are being fired. One of the workmen is clearing away the cinders, while another is holding the fan with which he will blow the fire as soon as his companion has insured a good draught.

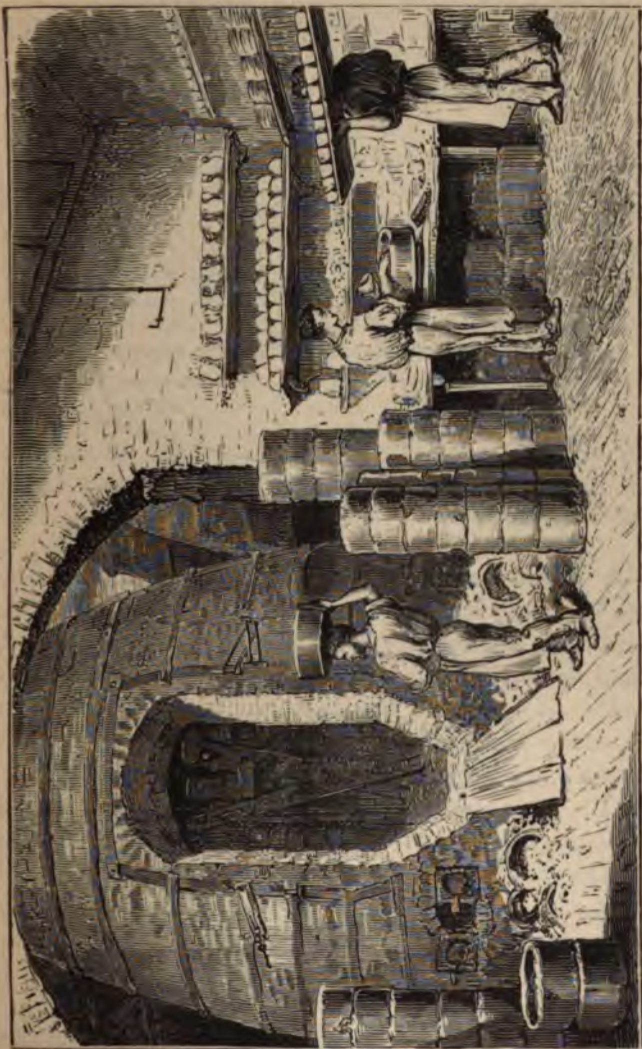
The next group shows that the firing has been completed, and that the oven has been allowed to cool. One of the workmen is removing the finished vessels to his assistant, who is packing them inside each other for transport, just as a gardener packs his

flower-pots. Lastly, a porter is depicted as carrying away the earthenware in baskets suspended from either end of a yoke.

In looking at the graphic representations of man and his handiwork as depicted on these ancient monuments, we seem to be taken back through thirty centuries, and to see with our own eyes the very scenes which must have been familiar to Abraham, Isaac, Jacob, and Joseph. Yet, after all, man and his handiwork alter less than might be imagined, and the arts and manufactories which flourished then are still existing, though with the improvements which are the certain result of experience.

By way of contrast with the ancient Egyptian potter, I have given an illustration of the process of firing as practised at the present day, and witnessed by myself not long before these lines were written. Reduce the size of the oven, put the workmen into Egyptian dress, and there would be the very scene depicted by the Egyptian artist some three thousand years ago.

FILLING THE OVEN.



CHAPTER XXXIV.

BASKET-WORK.

Kafir Basket-work—The Zulu hut—Circular walls—Dingaan's House—The woman's basket—The beer and milk-baskets—Beer-strainer—The Kafir bed and pillow—Attachment to the bed—Dyak Mat-work—The Tambok of Borneo—Guianan basket-work—The Quake and its uses—The Itiritti reed—The Colander; its structure and use—The cassava bowl—New Zealand basket-work—Dinner in baskets—Potato-washing—The foot and the basket—Australian baskets—The Paingkoont—Australian fishing basket—New Caledonian basket.

AT the beginning of the last chapter I called the reader's attention to the fact that the Zulus, although possessing very primitive ideas of art, and not nearly equal to pre-historic man in pottery-ware, could, at all events, make good baskets. In basket-work generally they excel, and, in fact, without a knowledge of this art a Zulu could hardly live.

Even his house is nothing but a big basket, like a magnified bee-hive, and, whether it be the palace of the king or the hut of the common soldier, the material and shape are the same. As to their shape, it is exactly similar to that of the well-known "igloo," or snow-hut of the Eskimo, *i.e.*, low, circular in shape, and with a domed roof.

The circular shape is universal among the various

tribes that go under the name of Kafir. A Kafir has no ideas of straight lines or angles, and what a Kafir student would make of Euclid it is beyond the power of imagination to conceive.

He cannot build a square or an oblong house, nor even draw a straight line. He can stick a peg in the ground, tie a string to it, and, by means of a sharp stick at the other end of the line, can trace the circle on which his house will be built or the fence of his enclosure raised. But, if he be desired to stretch a string from one peg to another, and raise a palisade upon it, he will utterly fail.

So, when he makes a kraal or assemblage of huts, all the huts are circular, and the fence with which he surrounds them is also circular. In warfare the line of battle is always curved, and this principle runs through his entire life.

However, this tendency to work in circles is exactly suitable to the construction of the basket-work houses in which he lives, and which are so simple in construction that even a child could make them. Long and flexible upright rods are stuck in the ground in a circle, bent down and fastened together at the tips, so as to produce a dome-like form. Then other rods are twisted in and out of the uprights, so that a hut can be constructed in a very short time.

The hut of a great chief, such as is represented in the illustration, is larger than that of his inferiors, but it is nothing more than a similar hut increased in size. Sometimes the interior is strengthened with lattice-work, and the posts which support it are ornamented with beads. One of Dingaan's huts almost deserved

the name of house, or even palace. It was supported by no less than twenty-two pillars, each of which was

Zulu Hut.

entirely covered with beads. But it is nothing more than a hut of basket-work, and, indeed, if it were made of stronger material, would be almost uninhabitable, for the fire-place (which, like everything else, is circular) is placed inside the hut, so that the wind shall not interfere with cooking, and there is no mode of escape for the smoke except through the inter-

Zulu making Door of Hut.

stices of the roof, which is, therefore, always black.

The only portion of a Kafir's hut which is not circular is the door, that is, if the inhabitants should indulge in such a luxury. It is not much of a door, after all, being made of rough basket-work like the rest of the hut. The method of making it is very simple, as may be seen by the illustration, where a married man, known as such by the wedding-ring

which he wears on his head, is making a door. The illustration is from a drawing made on the spot.

Kafir Women Basket-making.

The finer kinds of baskets are made by the elder women, who are beginning to be too feeble to do hard work.

There is as great a variety of baskets among the Kafirs as among ourselves, each having its special use. There is, for example, the ordinary "woman's basket," which may be called a basket of all work, one of which is seen in the right-hand corner of the illustration. If the reader will refer to the cut which represents the interior of the chief's hut, he will see a similar basket near the circular fireplace.

The beer basket is also the work of the women.

Zulu Milk Basket. (From my Collection.)

One of these curious vessels is seen in the illustration. In order, however, to give the reader an idea of the exceeding closeness of the work, I have had a drawing made of a small basin for holding milk, beer, or even water. As is the case with barrels which are made of separate staves, it is apt to leak when it has been dry for some time. But an hour's immersion in cold water, or five minutes in hot water, will make it perfectly water-tight.

This is the vessel which was exhibited at the conversazione. See page 459.

The reader may remember that the native beer must be passed through a strainer before it is fit for use. One of these strainers is shown on the left hand of the illustration. The workmanship is wonderfully close and fine, and, as I can state from practical experience, it is as effective a strainer as any that can be made in England.

Zulu Beer-strainer and Woman's Basket. (From my Collection.)

The "woman's basket," which is shown on the right of the same illustration, is here given in order to show its peculiar structure. It is exceedingly strong, so that it will withstand the hard work to which it is subjected, and yet it is very flexible, and can accommodate a wonderful quantity of the miscellaneous articles which form part of a Kafir woman's working outfit.

I was for some time uncertain as to the category in which the mat which is here figured ought to be

placed, but the intertwined strings which fasten the parallel reeds together are clearly the analogues of the transverse twigs of basket-work. No one who did not know the object for which the mat was intended would be likely to conjecture its office. It is, in fact, a Kafir bed, and the natives cannot sleep with comfort on any other. Their attachment to this bed is shown by the following story.

A chief had made overtures to a man with two daughters, and offered to buy them as wives. Both the father and the daughters disliked the intended

3

Kafir Bed.

husband, and the offer was declined. Whereupon the aggrieved chief carried off both girls by force and took them to his kraal.

In the dead of night one of them, named Uzinto, stole silently away, made an opening in the fence which surrounded the kraal, and crept through it into liberty. In spite of the wild beasts, venomous snakes, and other dangers, she set off on her perilous journey, and after many adventures, including a recapture and a second escape, she made her way to the Tugela River, crossed it, and was out of reach of

her persecutors. Although in such danger by day and night, she did not forget to take her bed with her.

These "beds" are rather to be regarded in the light of under sheets than beds. When a Kafir prepares his bed, he plucks a quantity of grass or leaves, spreads this mat upon them, and then lies down. The head is mostly supported by a wooden pillow—a most uncomfortable custom according to our ideas. Yet the wooden pillow prevails over a very large portion of the world. Even in this country, the late Charles Waterton always lay on the floor, and supported his head on a block of oak.

In the illustration on page 558, the owner of the hut is supposed to be away on a war expedition, and his wife has, according to custom, hung his sleeping-mat, pillow, and spoon, within reach of the rays of the rising sun. As soon as the first sunbeams show themselves, the wife anxiously watches their effect as the rays of the sun fall upon the mat, pillow, and spoon. If they throw a shadow, she knows that her husband is alive, but, if she can see no shadow, she makes up her mind that he is dead, and that she will see him no more.

The remarkable six-legged pillow may be seen hanging above the long spoon and rolled mat. The figure of this particular spoon is a portrait, and will again be mentioned.

None but the married men possess the bed and pillows, the "boys," as all unmarried men are called, being able, from long practice, to sleep anywhere.

These mats are made of the stems of a tall grass, and are about three feet six inches in width. Their

length depends very much on the stature of the owner, but six feet is the usual average. The reader will probably have noticed that the structure of the Kafir bed is almost identical with that of the New Zealand mat, the chief distinction being, that in the latter parallel strings are used instead of grass-stems.

The reader must have already noticed that weapons, implements, clothing, and other examples

Dyak Mat.

of man and his handiwork, seem to spring up independently in different parts of the world, although it is geographically impossible that any communication could have taken place between the different countries. Here is an instance of this resemblance.

At a little distance the mat which is here figured, and the bed-mat of the Kafir might almost be mistaken for each other, and indeed, they are intended to serve similar purposes. But the Dyak mat is

very much larger than that of South Africa, and is infinitely its superior in point of workmanship. It is made of very narrow strips of rattan reeds, about the eighth of an inch in width. These strips are cut with the angular handled knife which is figured on page 114. Despite the clumsy look of this knife, it takes so keen an edge, that with the specimen figured I mended a pen and cut a sheet of note paper asunder while holding it in the air. Yet many years had passed since it left Borneo, and no sharpener had been applied to its edge.

Holding the handle of the knife under his arm, the Dyak applies the end of the rattan to its edge, and, guided merely by the eye, cuts it into these long, narrow strips. Sometimes the rattan is dyed of various colours, red, yellow, and black being the principal hues, but is sometimes, as in the present case, allowed to retain its own pale yellow hue.

The specimen which is here figured measures nine feet long and five feet wide, and is so woven that the most intricate patterns are produced by it. A small portion has been drawn on an enlarged scale. All these mats are made by the women, and, as the interweaving of the rattan strips is done entirely by hand, the process is a very long one. Time, however, is of not the least consequence to a Dyak woman, who does not care whether the work be finished in one month or twenty.

As the reader may see by looking at the enlarged portion, the Dyak mat is, like that of the Kafir, a thin, flat piece of basket-work.

A piece of Dyak workmanship of similar character, but formed into a basket, is here figured. Both the

mat and the basket were brought from Borneo by T. C. Grant, Esq., of Kilgraston.

Bornean Tambok Basket. (From my Collection.)

The basket is called by the name of Tambok, and is made in various sizes. So useful is the tambok that it is employed equally by the Dyaks, the Malays generally, and the colonists. The material is the leaf of the Nipa palm, cut into strips about the sixteenth of an inch in diameter, and stained yellow and red. The real shape of the tambok is cylindrical, but is forced into a squared form by means of four upright strips of a hard, red-coloured wood, lashed to the basket at intervals with the ever-useful rattan. Strong hoops of split rattan strengthen the mouth of the basket, and the cover is guarded in the same manner.

The strength and elasticity of the tambok are really wonderful, and even the roughest usage makes little impression upon it. This very basket was constantly used in Borneo for more than four years. It was used on board ship during the voyage homewards, then used in Scotland, and then in England for a term of years, and when it was given to me it was as good as when new.

The three baskets of Guianan manufacture which are here given have a double right to a place in this work. In the first place, they are very characteristic forms of basket-work, and, in the next, they are necessary adjuncts to the preparation of the cassava bread, which is described on page 454.

The first of these baskets is popularly called by the name of Quake, and is a basket of all work.

It is made from the Itirité, or Itiritti reed (*Maranta obliqua*), the same material which has already been mentioned in connexion with the blow-gun and

wourali poison (see page 281). This reed, when split, is very much like the rattan, being equally strong and flexible. When the natives begin their preparations for making cassava bread by digging up the roots, those which are suitable for the purpose are put into the quake and are carried in it to the houses, where they are first peeled, and then scraped on the Tumarrie, or board stuck all over with sharp flint-flakes.

The Guianan Quake.
(From my Collection.)

As the reader may remember, the next process is to squeeze out all the poisonous juice into the cassareep pot, by placing it in the "matappi," or native press, and applying severe pressure to it. Next it is put into the colander and carefully rubbed through it until it is reduced to a coarse meal.

The material of which the colander is made is quite different from that of either the quake or matappi. It is a flexible but very hard sort of twig, not flat, but cylindrical, and woven with astonishing ingenuity.

Being shaped like an inverted dome, the twigs would all meet at the bottom if they were woven in the ordinary fashion, and the apertures would gradu-

ally become smaller and smaller. But, by occasionally removing a twig as he works round the basket, the maker has contrived to keep the apertures of almost the same size throughout.

Guianan Colander. (From my Collection.)

Another vessel is now required in which to receive the meal, as we may call it. This is shown in the illustration, and, as the reader will see, is of quite a

Guianan Cassava Bowl. (From my Collection.)

different construction. This basket or bowl is of another material, and is woven so closely that, al-

though it will not hold water, like the Kafir baskets, which have been already described, it will float for some time on water, in boat fashion.

A closely-woven structure is especially required among the tribes of the interior, who not only scrape and press the cassava root, and put it through the colander, but also grind it into a fine flour between two stones, just as is done by the Kafir women. The width of this bowl rather exceeds two feet.

There are many varieties of all these baskets, but those which are figured will serve as types for them all. The reader will probably have noticed that here is another instance of a similar idea being worked out in different materials. Thus we find the Kafir of South Africa, the Dyak of Borneo, and the various tribes of Guiana, all making admirable basket-work of the materials which are furnished by the physical conditions of the country which they inhabit.

Let us once more visit New Zealand, and there we shall find plenty of basket-work, the long blades of the phormium furnishing the material.

We are all familiar with the well-known tool-basket of the British workman (the American workman has for the same purpose a flat box, shaped like a plate-basket, and having a single handle in the middle), with its two handles, and its capability of accommodating itself to any kind of tools, from the hammer and gimlet to the saw and centre-bit. It is rather startling to find that the Maori of New Zealand makes a basket which is so similar in every respect except material, that, if it were used by a British carpenter, it would attract no notice.

Perhaps there is no country where more baskets are made in proportion to the population, and are so little used. This remarkable fact is due to the custom of tapu, or taboo, connected with the distinctions of rank and the rigid code of etiquette which prevails in New Zealand, especially with regard to food. Cooking is regarded as the most degraded of occupations, and this strange idea extends to the food itself, so that to raise any cooked food above the

New Zealand Basket.

head of a chief (which is always considered to be tapu) would be equivalent to offering him an insult which could only be wiped out in blood.

Every now and then a great chief gives a banquet the etiquette of which is as minutely observed as at a state dinner among ourselves. The provisions are arranged after one of two fashions, *i.e.*, the scaffold and the wall.

The former is sometimes as much as fifty feet in

height in its successive tiers or floors, and each floor is heavily laden with dried fish, pigs, sweet potatoes, and other food. The wall is sometimes of almost incredible size. Mr. Angus (to whose pencil I owe the portrait of Parâtené and several other illustrations) mentions, in his magnificent work on New Zealand, that he was present at one banquet where the wall of food was five feet wide, five feet high, and more than a mile in length! This seems almost incredible, but another chief, named Ta-wharo-whero, intended to eclipse it, and set a thousand men to work at planting sweet potatoes for a banquet to be given in the following spring.

If the tapu were not in existence, there would be no difficulty in disposing of even this mass of provisions. But every chief is so tenacious about his own rank, and so sensitive to any infringement of it, that the distribution and consumption of the food cannot be accomplished without employing old and trusted masters of the ceremonies, who know every man's rank, and are learned in all the intricacies of the unwritten Maori "Red Book."

The floors of the scaffold are by them apportioned to the different districts, and, if the food be built into a wall, the wall is divided in similar manner. This is quite sufficient for the common people, but there is yet a difficulty about the chiefs. When a chief even touches with a finger any food, or any vessel containing food, he at once communicates his own tapu to it, so that any man of higher rank cannot condescend to touch it, and no one of lower rank dares put a finger on it.

So, in order to evade the horns of this dilemma, the food which is intended for the chiefs is put into baskets, each containing a goodly portion of the different kinds of food. When, therefore, a chief's name is called, he takes one of these baskets, and goes to some retired spot to eat it alone. Having finished his repast, he leaves the basket and unconsumed provisions on the ground, and there they are allowed to remain.

Thus it is that so many baskets are required in New Zealand. A two-handled basket, similar in shape to that which is figured on page 572, is used in washing potatoes before they are cooked. The basket, which is called a "kit," is made with large "interstices between the intersections," and the potatoes are placed in it, carried to running water, and thoroughly washed. This is the work of the women, and requires some strength and much skill. Immersing the basket in the water, she puts one foot in it, taking a handle in each hand, just as a man does when trying to force clothes into a carpet-bag, and, standing on one foot, rolls and stirs the potatoes about with the other until they are quite clean.

Low in the scale of humanity as are the Australian black men, they possess the art of making very fair baskets.

They go, however, on a different principle in making them. Instead of beginning a sort of skeleton or framework, and then intertwining strips of flexible material among the rods, the Australian makes nearly all his basket-work in a fashion which is identical with that of our common straw hives.

He takes dried reeds or grasses, according to the coarseness or fineness of the intended baskets, and twists them into a kind of rope. He then coils the rope round and round, and as he does so, lashes, or perhaps sews, the coils together with a strong thread, which he procures from the roots of the native bulrush. When the sides of the basket are carried up to a sufficient height, the rope is severed, the end tightly

Australian Baskets.

fastened down, and the mouth strengthened by a rope of double thickness.

It is worthy of notice that the natives who inhabit the districts about the Lower Murray River employ precisely the same mode of operation when they make the extraordinary circular mats, which serve them as cloaks, baskets, cradles, and sometimes do

duty as houses. This singular mat, which is called by the name of Paingkoont, is about five feet in diameter, and when laid on the ground resembles a large archery target, made of thin cord, instead of thick ropes of straw.

The paingkoont is tied to the wearer in a manner which, to European eyes, presents a most ludicrous appearance. Two cords are attached to the edges opposite each other, so as to leave one-third of the circumference above them, and two-thirds below. The paingkoont is then slung on the back, and the cords tied together just under the neck, so that the wearer looks as if he were standing in the bowl of a huge spoon, the point projecting over the back of his head.

It does not cover the body, and is worn, not as clothing, but as a wind-screen. If, for example, a man wants to light a fire on a windy day, he need not trouble himself about a sheltered spot as long as he wears this mat. All he has to do is to squat on the earth in the usual native fashion, when the lower edge of the paingkoont comes to the ground, and pushes the upper end so high that the man sits inside its shelter, and can make his fire undisturbed by the wind.

The sea-coast people, who wear the remarkable mantle described on page 499, make conical baskets, or rather creels, of a sugar-loaf shape. There is no bottom to them, and their object seems rather enigmatical. These are fishing-baskets, and are used in a very ingenious fashion.

Along all muddy coasts there are sundry marine

animals, including fishes, which live concealed in the mixture of mud and sand. It is impossible to detect them by the eye, and they are so readily alarmed that they cannot be secured by the unassisted hand.

So the fishers, who are mostly women, wade into the shallow waters, gently push the lower edge of the

Fishing Basket.

basket a few inches deep into the mud, and then, by putting their hand through the open top, they can secure every living thing within the circumference of the basket.

These conical baskets are also made of ropes, coiled into shape and firmly lashed together.

Whether Australia and New Caledonia, which lies to its north-east, were once united, is still a moot point. It is certain, however, that the present New Caledonians are not aborigines, and that they and the Australians are in many respects similar to each other. The New Caledonians, for example, have a club which is almost identical with the marpangwe club of Australia, and both throw the spear by artificial leverage, the one using for this purpose a stick and the other a thong.

Basket. New Caledonia.

In some respects, the New Caledonians have made greater progress in civilisation, and they are far better workers in stone, some of their cannibal knives being admirable examples of savage work. The blades of these knives are made of serpentine, are quite flat, and oval in shape, so that in general outline the knife very much resembles a Japanese fan or fire-screen.

They use baskets for many purposes, especially for carrying the oval sling-stones which they use with such tremendous effect and certain aim.

A figure of one of their baskets is given here, for the purpose of showing its resemblance in form and structure to the fishing basket of Australia.

CHAPTER XXXV.

TRAPS.

Prototypes of the Pitfall and Net—Invention of the pitfall—Reason and instinct—Catching an old rat—Rats at the Crystal Palace—Kafir pitfalls for the giraffe, elephant, and rhinoceros — Baited Traps—Fall traps—The Sieve and Brick traps—" Figure of Four" trap—Fox traps—Traps for Sable and Wolverene—Depredations of the wolverene—The Scotch Eagle trap—The Wild Turkey trap—The trench and the bridge.

TRAPS and Fishing are two branches of our subject, and will therefore be treated successively.

It is a remarkable fact that the pitfall, which is undoubtedly the earliest form of trap, and the net, which we know to have been used from the earliest ages, should find their prototypes in the animal kingdom.

We are all familiar with the fact that the ant-lion catches unwary insects in its sandy pitfalls, and some of us may have seen the way in which the ant-lion larva, itself hidden, flings up its showers of sand, which come sliding down the declivity of the pit. We all of us are familiar with the spider, who spreads her net for insects that fly through the air, just as man spreads his net for the capture of fishes that swim through the water.

I do not, however, believe that man took the idea of the pitfall from the ant-lion, or of the net from the spider. Driven by the necessity for catching the beasts of the field, the birds of the air, and the fishes of the water, he conceived, by the power of his reason, the means of effecting these captures, and by his handiwork put these means in operation.

So, when man first dug a pitfall, he did so with the intention of inducing a beast to fall into it; and, when he first spread a net in the water, he designed and made that net with the intention of entangling fish in it. Yet, the ant-lion cannot know, when it digs its first pitfall, the reason why it burrows in the sand and forms a wide funnel, at the bottom of which it awaits food. It has no instructors. It never saw its mother who died long before it was hatched. Even had it seen her, she could have given it no instruction, for, before she could lay eggs, she was transformed into a long-winged, long-bodied insect, closely resembling a dragon-fly.

Neither could the creature know that other insects existed which ran about on the level ground instead of burrowing in sand, nor that, if they ventured on the brink of its pit, they would fall into it. Neither had it the option of making a pitfall or running after its prey in fair chase. It made the pitfall in absolute ignorance of its object, and was as much compelled by instinct to dig the pitfall as it was compelled to breathe. No choice was left to it.

But with man the case is entirely different. He is not compelled by instinct to make a pitfall, but may do so or not as he chooses.

Should he dig a pitfall, he does so because he has observed the habits of animals. He notices the track which they usually follow, or, if there be none, he prepares one into which he can drive them. In that path he digs a pit, and, lest the animals should see the pit and avoid it, he covers the mouth with materials which will not bear the weight of the animal which is to be caught, and prepares the surface so as to make it look like surrounding objects, and deceive the eyes of his intended prey.

Sometimes man has to measure his reason against that of the animal, as any one will know who has tried to catch an old and experienced rat. He may take plenty of rash, hot-headed youngsters, but the old "greybeard," as he is called, treats all known traps with contempt, and, when at last caught, he falls a victim to the superior reason of the man.

So it is with the elephant, which is quite as sagacious an animal as the rat. Instinctively suspicious of any ground which seems as if it might be unable to bear its weight, the elephant, when once it has made acquaintance with pitfalls, brings its reasoning powers to the aid of its instinct, and will traverse no path without sounding the soil with its proboscis.

All elephants go in herds, each herd under the guidance of an old and experienced leader, and these leaders will order the herd back until they have tried the ground and uncovered every pitfall in the way. Mr. Waterhouse Hawkins told me of similar behaviour on the part of the rat.

When he was engaged at the Crystal Palace in making his splendid models of extinct animals,

great numbers of rats haunted the place for the sake of the scraps of provisions left by the workmen.

Mr. Hawkins was obliged to remain at work long after the men had left the place, and was much interested in the proceedings of the rats. When the men had withdrawn and all was quiet, the hungry youngsters would appear on all sides, and would have made a dash at the plates. But a few old rats always drove the young ones back, went cautiously to the plates, and carried off the food to their hiding-places, not eating a morsel themselves until they were in safety.

Kafir Pitfall.
(*Section showing form of pit*).

Man, therefore, is obliged to set his intellect against that of the animal, to enter into its mind, to foresee its mode of action, and to alter his proceedings accordingly. But no ant-lion could do this. If the ants and other insects were wise enough to avoid the pitfall, and take another path, the ant-lion would not be able to penetrate their plan of action, and overreach them by digging another pitfall across their new route. This, however, is exactly what man would do under similar circumstances.

Again, man suits the pitfall to the animal which he desires to entrap, and makes a different pitfall for the giraffe and elephant or rhinoceros.

Here, for example, is the pitfall made for the purpose of catching the giraffe.

It is evident that to dig a pit deep enough to receive the entire animal would be an expenditure of useless labour to the diggers, and afterwards in taking the body out of the pit. So it is first dug, like any other pit, to the depth of about five feet, and then divided into two pits, leaving a wall between them as seen in the section.

Once in this pit, the giraffe has no chance of escape, as, no matter in which direction it falls, the body is balanced on the wall, and the feet are unable to rest on the ground.

The elephant pitfall is constructed on a similar principle. The hunters wish to hold the animal so securely that it cannot escape, and at the same time to be able to attack the vital organs. The pit, therefore, is not nearly large enough to receive the animal, and is made in the shape of a cone, with the apex downwards. When the elephant falls into one of these holes, all its feet converge, and by its weight are kept jammed together so firmly that, while it is endeavouring to extricate itself, the hunters can inflict mortal wounds with perfect safety to themselves.

The pitfall which is intended for catching the rhinoceros or buffalo has an upright sharply-pointed stake, some five feet long, stuck in the centre of the hole, so that, when either of these active animals falls

into the pit, it is transfixed by the stake. All these pitfalls show forethought on the part of their maker, and an adaptation of means to end. They are entirely the production of reason, and instinct has nothing to do with them.

THE pitfall entraps its prey merely through inadvertence on the part of the victim. But there is another group of traps which attract the victim by means of a suitable bait. These are so many in number, and the devices which man employs are so infinite in variety, that I can only mention one or two of the most prominent.

The common Sieve trap of our boyhood is a well-known type of many traps which are intended to catch much larger game than sparrows. I need hardly mention that this very primitive trap consists of a sieve set on edge, and supported by a stick to which a long string is tied. Crumbs or corn are put under the sieve, and, when any birds are engaged in pecking at the bait, the stick is jerked away by the string, and the sieve falls over the birds.

This kind of trap, however, requires constant watching, and therefore self-acting traps had to be invented. Of these we may instance the Fall traps, of which the common brick trap is a familiar type, and the principle is carried out in a variety of forms.

One is the Fox trap of Siberia and Northern Europe and America. The mechanism by which the roof of the trap falls when the bait is touched is composed of three strips of wood arranged so as to

resemble the figure 4. In fact, it is simply the "Figure of Four" trap on a large scale.

Fox Traps.

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The next trap to w
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Sable and the Wolve
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for less than five or six pounds, while the finest specimens cost at least three times that amount.

The extreme value of this fur does not so much depend upon the rarity of the sable as upon the difficulty of obtaining it.

The sable-hunter has to undergo such privation that none but the hardiest of the hardy dare to under-

Sable Trap.

take the task. The sable lives among the pathless woods, and must be followed to its haunts through snow and over ice, and many a hunter has perished on his rounds, his remains not being found until the spring.

The man has from forty to sixty traps, and places them in a large circle, going his rounds as regularly

as the weather will permit. But he has many obstacles to surmount besides the weather.

In the first place, the sable is an exceedingly wary animal, so that great skill is needed in setting the trap and arranging the bait. In the second place, the wolverene (sometimes known as the Glutton) is his deadliest enemy. The creature combines in itself the cunning of the fox and the activity and endurance of the weasel tribe to which it belongs. It discovers the footsteps of the hunter, and follows his track round the traps. If the trap should have been newly baited, the wolverene springs the trap, and then eats the bait ; or, if a sable should be caught, the wolverene eats both bait and sable. Worse than all, the animal has learned by experience that the hunter is obliged to hide his stores of provisions (caches, as these hidden stores are called), and displays an astonishing amount of cunning in discovering them. Several of the deaths of sable-hunters may be attributed to the wolverene, which devoured their provisions and left them to starve.

Another reason for selecting this trap is, that the mechanism is not that of the figure of 4, but is identical with that of the brick trap. The reason for the primitive simplicity of these traps may be found in the fact that, although it would be possible to devise a trap which would be more effective in catching the animal, such a trap might injure the fur, and so destroy the value of the animal.

I will conclude this subject with two bird traps of singular ingenuity, both displaying a profound knowledge of the habits of the birds.

The first is the Eagle trap of Scotland. In former days, eagles were so plentiful in Scotland that they worked much havoc among the young lambs, and so the shepherds invented a trap which hardly looks like a trap.

It is simply a circular tower, roughly built of stones, and somewhat resembling in shape the Australian fishing basket, which is figured on page 577. Its height is about four feet, and it is about the same in diameter at the bottom, narrowing to about two feet at the top, which is left open. There is no cover, and all that is needed is for the shepherd to drop a dead lamb into it and retire to some place where the eagle cannot espy him.

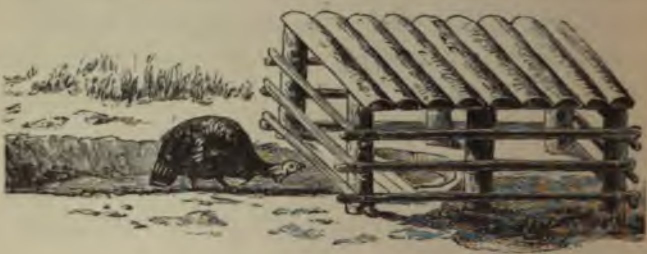
Before long the eagle, circling high in air, is sure to see the dead lamb, and is equally sure to swoop upon it. He perches on the edge of the tower, and, finding that he cannot reach the bait, jumps down upon it.

Once in the trap, he will never leave it a free bird; for, when he thinks to return to his home, he finds that the edge of the tower is too high to be reached by a single hop. Therefore he spreads his wings, thinking to help himself up with them.

But even the half-spread wings will not pass through a circular opening of only two feet in diameter, and so he falls back again. He cannot reach the mouth of the trap without his wings, and he is unable to spread them. So, after allowing him to tire himself out in unavailing struggles to escape, the shepherd flings his plaid over the bird, ties up its beak and legs, and can always sell it at a good price.

The second trap is used for catching wild turkeys and is even still more ingenious.

A sort of small hut is made by driving stakes into the ground, a few inches apart, so as to enclose a parallelogram, and then laying small split logs on the top by way of a roof. There is no door, but under one end of the hut a hole is dug, and enlarged into a gradually-shallowing trench, so that any creature, by passing along the trench, can enter the hut. This trench is sunk just deeply enough to



Turkey Trap.

allow a turkey to pass into the hut by walking through it and stooping its head. A board is then laid across the end of the hut in the interior, so as to cover the trench, and is firmly pegged down. This part of the work is done before the roof has been fixed.

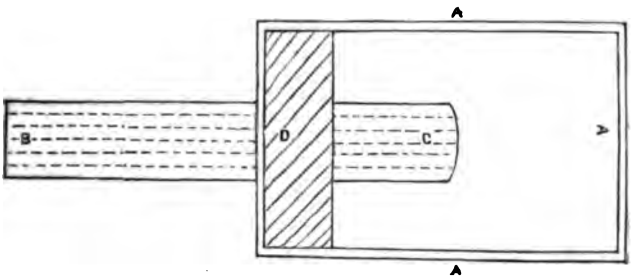
The external appearance of the turkey trap is shown by the accompanying illustration.

Grains of maize are then scattered about the trap, and a considerable number thrown into it, so that they can be seen through the stakes, and especial care is taken to strew them along the trench. In

order to make the construction of the trap more clear, a plan is here appended. A is the wall of upright stakes. B C, the trench, gradually deepening from B to C. At D is shown the board which, as the reader will see, passes over the trench.

The working of the trap is as follows.

A turkey visits the spot, sees the grains of maize, and begins picking them up. This brings him to the trap, in which he can see plenty of food but cannot reach it. Naturally, he walks round it, until he comes to the trench. The bait, so plentifully strewn within



Plan of Turkey Trap.

it induces him to walk along it, picking up the maize as he goes along, and at last he emerges from the trench at C.

There is no hindrance to his retiring by the same path, but he never does it. Experience has taught the trapper that, when the turkey is trying to find a way out of his prison, he always skirts the walls. In so doing, the bird would, of course, come to the trench, and, if it were left entirely open, would escape through it. But the trapper has provided against this mode of escape by laying down the board D, so

as to m ke a bridge across the trench. The turkey alw osses this bridge, and then recommences his ... So he goes on, parading round and round, ar ach time walking *over* the trench, one step into which w set hi As to going into the mid e floor, ar rging through the inner end trench, he ne hinks of it.

S times, if the tr r be fortunate, two or thr keys will be in trap at the same time, and of them walking und and round in single file.

CHAPTER XXXVI.

FISHING.

The Hook and the Needle—A make-shift hook—New Zealand hook—The Spoon bait—Imitation of flying-fish—No bait required—Mode of using it—Eskimo hooks—"Snatch" hooks—"Jigging for frost-fish" in America—"Gaffing" salmon—"Tickling" trout—A reversible hook—Halibut fishing—A giant among halibuts—Bronze hooks—A double hook—The net—Swiss Lake-dwellers—Discovery of nets and stone weights—Netting needles—Eskimo net-makers.

WHETHER the Hook or Net had the precedence in point of time, it is impossible to say; but that both were employed from the very earliest ages there can be no doubt. We will begin with the hook.

We have already seen that several weapons and implements interchange their offices, and are made like the dagger and knife, "a double debt to pay," and I am inclined to think that this needle, with the central hole, may have also been used as a substitute for a hook. The figure has already been employed while illustrating another subject; but, for the reader's convenience, I repeat it here.

At the present day such a substitute is frequently used when a hook cannot be obtained. A piece of bone or hard wood is shaped to a double point, and a

hole bored through the centre ; we will call this instrument a spindle.

The line having been passed through the hole, and firmly secured, the spindle is turned parallel with the line, and very slightly held by a single "half-hitch." The bait is then affixed in such a manner as to hold the spindle in its relative position to the line until it has been swallowed. When the angler has made sure that the bait has been swallowed, he pulls the line with a smart jerk, which causes the half-hitch to give way. The spindle then sets crosswise in the interior of the fish, and enables the angler to secure his prey.

Bone Needle.

This contrivance, however, can only be considered as a make-shift, and it is evident that the hook was nearly, if not quite, as ancient as the spindle. Again we will make the uncivilised races of the present day our keys to those of the pre-historic time,and see the hooks which they now employ.

Here is a New Zealand hook, which is a marvel of ingenuity. If any of my readers should happen to be anglers, they will be familiar with the "spoon bait," *i.e.*, a plate of polished metal shaped like the bowl of a spoon, and having a flight of hooks attached to it. It has the great advantage of needing no bait. It revolves rapidly as it is drawn through the water, and its glittering surface deludes the pike, trout, or other various fish into an idea that it is a living fish of convenient size for them to eat.

The Spoon bait is quite a recent invention in England, but the New Zealanders and Polynesians had for very many years employed a hook constructed on an exactly similar principle. Here is a New Zealand "spoon bait." The back is made of hard wood, the point is of bone, and the plate which lines it is made of the glittering ormer shell. Just below the bark is a tuft of cocoa-nut fibre, which, when the hook was perfect, was several inches in length.

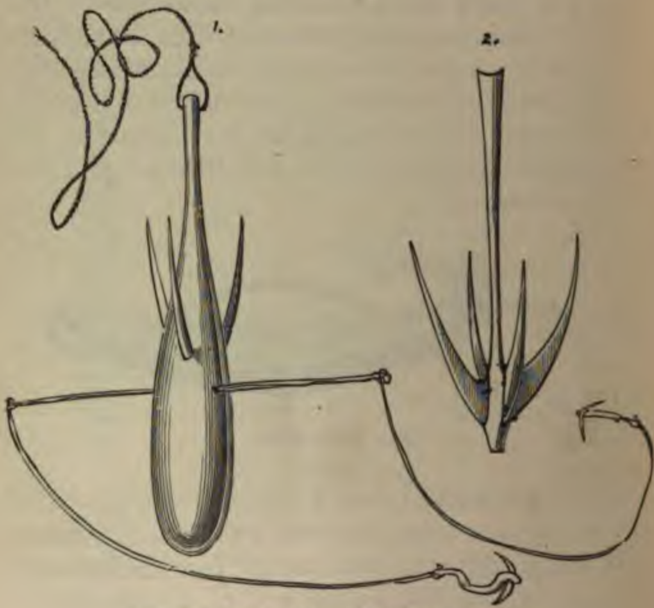
This hook is intended to simulate the flying-fish, and is especially employed for the capture of the Coryphene, the beautiful fish which sailors *will* persist in calling a dolphin.

New Zealand Hook.

When this hook is used, it is fastened to the end of a long line, and towed astern of a swift-sailing canoe. The line is seldom allowed to trail from the gunwale, but passes over the forked end of a spar that is rigged astern on purpose, so that it makes a considerable angle with the sea.

As the vessel pursues its course, the hook leaps and jumps from wave to wave, revolving the meanwhile, and presenting so close a resemblance to a veritable flying-fish, that even human eyes have been deceived by it. The Coryphene, and other inhabitants

of the water that feed largely on the flying-fish, naturally mistake the glittering surface for the shining body, while the fibre tuft all sparkling and dripping with water looks wonderfully like the "wings" of the flying-fish, and thus the coryphene is lured to its destruction.



Eskimo Hooks. (From the British Museum.)

The complicated hooks which are here figured are of Eskimo manufacture, and are most elaborately made. They require no bait, but are used in a fashion which our anglers of the present day would repudiate as arrant poaching. However, the Eskimo has no such scruples. His business is to catch fish for

the use of himself and family, and he considers every means as lawful if it only succeeds in taking fish.

When these "snatch-hooks," as we will call them, are used, they are moved gently up and down in the water, so as to work upon the curiosity of the fish. Although the intellect of a fish is, as may be seen from its imperfect brain, of a very low order, the spirit of curiosity is in some of them as strongly developed as it is in cats.

Attracted by the novel sight of a shining white object rising and falling in the water, the fish swims round it in order to see whether the unknown object may be good to eat, and as soon as some of them are in a favourable position the Eskimo jerks the line sharply upwards, and catches the fish on the hooks.

An exactly similar process of fish-catching is employed on the American lakes and rivers in winter-time, and goes by the name of "jigging." I transfer to these pages an account taken from an American newspaper, the *Norwich* (*Conn.*) *Bulletin*.

"Jigging for frost-fish is now the sport here.

"At this season the fish crowd into the shallow water along the shores of the Thames. When the first ice makes, the frost-fish jigger is out for business. He needs no bait, but, knowing the habits of the fish, relies wholly upon stratagem.

"He provides himself with two sticks, two feet in length. Upon the end of one he ties a cluster of oak leaves, and at the end of the other he fastens a sharp hook, making a miniature gaff. He takes his bushed stick, and puts it down in from eight inches to a foot

and a half of water, and begins to oscillate it patiently, when the frost-fish come to it as dogs and cats come to meat.

"They swim slowly beneath it, rubbing against the leaves, and expressing signs of gratefulness at finding such shelter, when the jig is deftly lowered alongside of them, and they are jerked out of the water with a suddenness that must astonish even a fish.

"The others do not seem to be frightened, but continue to swarm beneath the leaves, and be hooked up as long as the jigger has patience to pull them. In this way, bushels of Tom Cods are caught annually from the Thames."

This plan of catching fish sounds to the ears of English anglers much like "snatching" trout or "gaffing" salmon; but these distinctions are merely conventional and arbitrary.

For example, in our own country "tickling" trout is considered as unsportsmanlike as shooting game while sitting. I never could understand this distinction, for the trout-tickler has to exert as much skill and patience as the wielder of the rod, much more endurance, and more acquaintance with the habits of the fish. To catch so wary, strong, and active a fish as the trout with the bare hands is surely as difficult a task as to take it with a baited hook, and ought to take rank as fair sport.

A hook of singular ingenuity is here given, as exemplifying the powers of human invention, even among uncivilised people. It is employed by the Aht tribes, which have several times been mentioned,

and the particular specimen which is here shown was procured on the shores of Vancouver's Island.

It is of considerable size, as, if it were straightened, it would measure rather more than a foot in length. The material is the Douglas pine, and the hook is bent into shape after being softened in boiling water. When not in use, a cross lashing is passed backwards and forwards so as to tie the point towards the shank, and so keep it in shape. The point is hardened by fire, and the hook is strengthened for some three inches from the point by a binding of strong vegetable fibre. The barb is made of a piece of bone, which in this specimen is five inches in length. Contrary to usual custom, it is affixed, not to the point but to the shank, and is wonderfully effective. Even if the fish, in its struggles, should manage to reverse the hook, it has still no chance of escape, as the barb then practically becomes the point, to which the fish is transferred.

Aht Hook. (From my Collection.)

With this apparently rude hook the Ahts can capture even the halibut (or holibut), one of the largest of the flat fish, extremely powerful, and possessing strong and sharp teeth. The average length of the halibut is from three to five feet or so,

and in his "Familiar History of British Fishes" F. Buckland mentions a "monster" which was caught in the North Sea, and measured six feet six inches in length.

But, while I was in America, at the beginning of April, 1884, a halibut was taken in Gloucester Bay, Mass., measuring nine feet in length, and weighing four hundred and twenty-six pounds. This I believe to be the largest that has ever been taken,

Bronze Hook.

Bronze Double Hook.

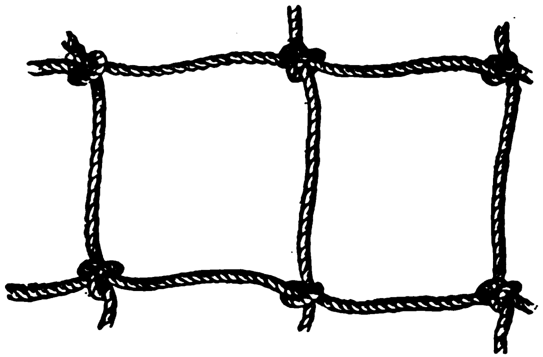
and it caused a great sensation all along the shores of Massachusetts.

It seems strange that in fishing for so powerful a creature the Ahts should not use iron hooks. But nothing will induce them to exchange the old-fashioned hook of wood and bone for one made of the best-tempered steel.

Since metal hooks were first invented we have made little advance as far as shape goes. The

hooks which are here shown, and which belong to the Bronze Age, are almost identical in shape with our own of the present time, even to the thickening and notching of the shank for the firmer attachment of the line.

WE now have to treat of the NET, a device which is of unknown antiquity, and which seems to have been invented by man whenever he drew much of his



Pre-historic Net

subsistence from the water. The net has more than once been mentioned in this work in connexion with other branches of our subject, and I shall therefore only touch slightly upon it.

The portion of a net which is here figured, is drawn from a specimen which was found among the relics of the celebrated Lake-dwellers of Switzerland, which were unexpectedly discovered rather more than thirty years ago, two years' drought having

caused the usual supplies to the lakes to be so diminished that the remains of human habitations became visible.

Extensive researches were pursued, and an astonishing revelation was made of whole villages, not to say towns, which had been built on piles driven into the lake exactly like those of South America, which have already been described. As in the Lake of Neufchâtel alone, the population of the pile-houses (Pfahlbäuten) must have exceeded five thousand, the title of the town is well deserved.

The houses were circular in shape, and were made of basket-work, much like those of the Kafirs. That these remarkable settlements must have occupied the same locality throughout successive epochs is evident from the character of the relics that have been recovered from the bed of the lake. Heads of stone axes, spears, and other objects have been found, showing that the inhabitants belonged to the Stone Ages. But, in addition to them, much pottery has been found, showing a great advance in civilisation, and a still greater advance was made manifest by the discovery of various articles of bronze, not only the weapons and tools which are necessary for the actual wants of human life, but necklaces, bracelets, pins, and other ornaments, including among them the very article which is now known as the Patent Safety Pin, and fondly thought to be quite a recent invention! Truly, "there is nothing new under the sun."

It is evident, then, that the inhabitants of these pile-dwellings must either have advanced gradually

out of the Stone epoch into that of bronze, or that the Stone men had been dispossessed by the Bronze men, and their habitations occupied by them. In either case, these settlements must have been continuously inhabited through a series of years far exceeding the period of known history.

How were these nets made?

It is tolerably evident, from the structure of the knot, that the pre-historic net-makers used netting-needles made like those of the present day. This opinion is strengthened by the fact that the Eskimos make out of walrus-bone a netting almost exactly like that which is used in England, and have used it from time immemorial.

How were these nets used?

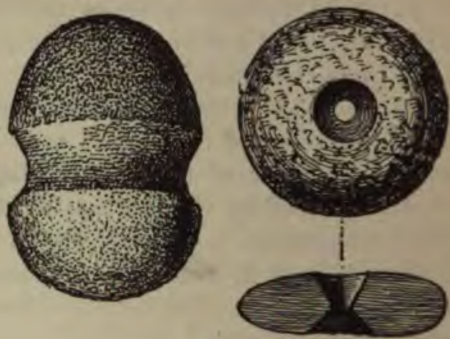
Evidently, just as we use our nets of the present day. The upper edge of the net is upheld by floats of some kind, while the lower edge is weighted by stones or lead, and so the net becomes a sort of perpendicular wall in the sea.

Then, by various means, the fish are driven into the net, their heads passing through the meshes. Their bodies, however, are too large to follow, and so the fish try to back out; but, as they are obliged to open their gill-cases in order to breathe, the strings of the mesh pass under the gill-cases, and so the fish is unable to pass either forwards or backwards.

That the nets of our predecessors were used in this fashion is evident from the discovery of the stone weights which were used at the lower edge of the net. They are of various forms and sizes, and two of the most characteristic have been chosen as examples.

I cannot but think that these implements might also have a double debt to pay.

The stone with the groove run round it would answer very well as a double-headed hammer, the



Net Weights.

handle being twisted round it like that of the American Indian tomahawk figured on page 156.

The pierced stone is almost identical in form with the head of a New Caledonian club, and might be used for a similar purpose.

CHAPTER XXXVII.

AGRICULTURE.

The Spade and the Plough—Subjection of the earth—The Digging-stick of Australia—Digging-stick of the Hottentots—The Iron Pick of the Kafir tribes—Cultivation of Maize—The Plough—Ancient plough and appurtenances—Plough of the Celebes—The plough-share—Saxon plough—Addition of the wheel, coulter, and wrest—The Sickle—Bronze and iron sickles—The ancient Egyptian sickle—Mode of reaping—Stubble fields—Bricks without straw.

ALL-important as is Agriculture, *i.e.*, the subduing of the earth by man, it can occupy but a very small space in the present work.

The Spade and the Plough are the chief accessories which man needs for breaking up the earth for the reception of seed, and the sickle for cutting the ripened grain. Even the elaborate machinery of the present day is only an extension of the primitive plough and sickle, which will be described in the present chapter. As this book is not a work on practical agriculture, but a slight sketch of the varieties of man's handiwork, I must content myself with giving one or two of the primitive agricultural implements, and will leave the reader to compare them with those which are now in use.

The spade in some form must have preceded the plough, and it is evident that the most primitive form

of spade is the sharpened stick, or the "Katta" of Australia, which has already been noticed on page 24.

Among the Hottentots there is an advance on the katta, and for a simple reason. The Hottentot is in a small way an agriculturist, whereas the Australian is none, and he therefore requires a more efficient digging tool. One of these simple spades is shown in the figure, and, as the reader will see, is nothing but an enlarged katta, weighted with a stone in order to give it greater power. Even with this adjunct it is but a clumsy tool, and can do but little work. The Hottentot, however, is a semi-nomad, his house being almost exactly like the gipsy tents of this

Hottentot Digging-stick.

country, so that he does not require to cultivate any large tract of ground. Time, moreover, is of no consequence to the Hottentot, and so she—for all hard work among uncivilised races is done by the women—can take as long as she likes in pecking up enough ground for her purpose.

The Kafir tribes, which inhabit settled localities, require more complete agriculture, and therefore a more powerful instrument is needed. This is found in the heavy iron pick with which the women are supplied.

In the illustration an old Kafir woman is seen resting a while from her labour, and behind her is the pick with which she has been working, and the

bundles of sticks that she has to carry to her home. These picks are made exactly on the principle of the axes which are figured on page 160, the "tang" of the blade passing through the wood.

Of late years, Maize, popularly called "Mealies," has been introduced into Southern Africa, and, as it grows very readily, has practically supplanted the

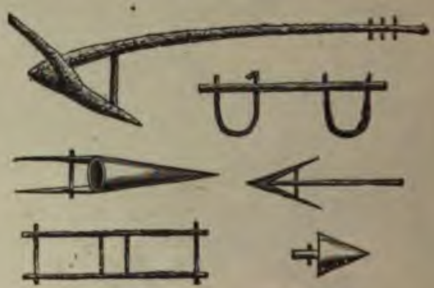
Kafir Woman and Pick.

native grain-bearing herbs. The reader will remember the important part played by the "mealie-bags" in the insurrection which cost Cetewayo his kingdom, and, practically, his life.

Next to the spade comes the plough, and it is really wonderful to see how trifling are the changes in this important implement. The plough which was used

before Moses was born is almost identical with that of Virgil's time, with that of our Saxon forefathers, and with the Oriental plough of the present day.

Here, for example, is the plough and its details, as used when Virgil wrote his "Georgics." The rough frame-work of the plough is shown above as it appeared when it was cut out of a large forking branch, and ready for the iron point, &c. Below are shown the yoke and collars for the two oxen (the "yoke of oxen" so often mentioned in the Scrip-



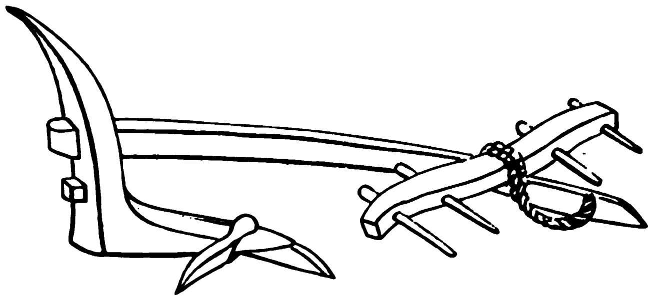
Ancient Plough.

tures), the iron point for the share, and the points of the goad and scraper.

That there should in the remote past have been any communication between civilised Europe and the Celebes Islands is, of course, impossible. Yet we find that man's handiwork is formed on exactly the same principles, and that the plough of Celebes is to all intents and purposes identical with that of Egypt and Rome, except that it is made out of several pieces of timber, and not of a single piece.

There is the long beam, with exactly the same slight curve in the same direction. There is the wooden yoke

with its rope collars, by which it is attached to the oxen. There is the single handle, projecting at exactly the same angle, so as to allow the machine to be guided by the ploughman, and there is the sharp separate point, for the purpose of turning up the ground. The chief difference lies in the fact that in the ancient Greek plough the point of the share was of iron, whereas in the Celebes plough it is made of hard palmwood. The latter shows an advantage over the former, in having the point of the shear so constructed that it can act as a mould-board.



Celebes Plough.

Passing to Saxon times in England, we find the general shape of the plough preserved, but three most important improvements introduced, by which its power was enormously increased.

The first is the addition of a wheel affixed to the beam, so as to make the movement steadier. The second is the form of the handle, which is double instead of single, so that the ploughman can guide his machine with more truth. The third improve-

ment is the addition of the coulter in front of the share, and the rist (or wrest) or mould-board behind it, so that the earth which was torn up by the share should be thrown on one side, and would not impede the machine when the next furrow was drawn.

Saxon ploughing.

That this plough was capable of working on heavy ground is shown by the fact that four oxen are required instead of two, and the depth of the furrow which could be cut is shown by the artist to the best of his imperfect though graphic art, by which all the salient points are most conscientiously indicated. Immediately following the ploughman is the sower with his bag of seed upon his shoulder.

In this plough of some seven hundred years ago we find the exact image of the plough that may be seen in every field in England at the present day, and even the steam-ploughs, which cut to so much greater depth than any horse-plough can do, and turn up great swathes of soil as though the earth were but water, are made on exactly the

same principle, and owe their superiority much more to the tractive power of the engine than to any superiority of structure on the part of the plough.

As to the shape of the Sickle, it has varied very little to the present day. The two sickles which are here represented belong to the Bronze and Iron ages respectively. Iron being a harder material than bronze, the implement does not require so great a thickness, and the blade is therefore comparatively thin.

1. Iron Sickle. 2. Bronze Sickle.

If we examine the ancient Egyptian monuments on which the processes of agriculture are depicted, we shall find the reapers carrying sickles shaped exactly like that of the iron sickle in the figure. They did not, however, use them as we do. They cut off the stem just below the ear, leaving all the remaining straw (the "stubble" mentioned in the Scriptures) to be removed by a subsequent operation.

Hence we understand the tyranny of Pharaoh.

This long stubble-straw was mixed with the clay of which the bricks were made, just as plaster is mixed with hair. The straw had heretofore been brought to the brick-fields, and even in that case the toilers could scarcely finish the number of bricks which had to be delivered daily under terror of the lash. This very scene is depicted in the Egyptian Monuments, and could not have been more exact in every detail if the artist had been ordered to illustrate Exodus v.

The effect of the order, that the men must find their own straw and still deliver the same number of bricks, was that the Israelites had to clear the ground ready for the plough, and to be agriculturists in addition to being brickmakers.

CHAPTER XXXVIII.

ADJUNCTS TO THE FEET.

Natural powers of the human Foot—A Chiropodist's opinion—The Sandal—Ancient Egyptian sandals—Egyptian Monuments—The Shoe-sandal of Japan—Hottentot sandals—The Mocassin of North America—The Snow-shoe—Its construction and mode of use—Hunters on snow-shoes—The snow-shoe in England—Her Majesty's mails—The skidor—Their use in war and hunting—The mud-patten of England—The Stilt—Shepherds of the Landes—A human tripod—Marquesan stilts and stilt-walkers—Races on stilts—Stilts in Wiltshire—The Apono stilt-walkers—The "Giant Dance."

WERE I an American, I should probably have headed this chapter with the single word "Foot-wear," though it would have been scarcely comprehensive enough for the present subject.

For all ordinary purposes the human foot will suffice the owner, but there are certain conditions which absolutely need the assistance of some adjunct to the foot. For mere walking or running purposes, no artificial aid or protection is required for the foot, and in heat or frost, on loose stones, level ground, hard rock, or marshy soil, the foot has the power of accommodating itself to surrounding conditions.

Even in very cold weather the feet need protection very much less than is generally assumed to be

the case, and I have been assured, by those who have been accustomed to go barefoot all their lives, that their feet are never cold except when boots or shoes were worn.

Some time ago I was obliged to consult a chiropodist, who not only proved to be a skilled anatomist, but was also an apt generaliser.

During the series of manipulations which were needed, I took the opportunity of discussing the

Ancient Egyptian Sandals.

subject of the human foot. To my surprise, he said that, except under exceptional conditions, no human being ought to wear anything on the foot except a sandal, and that even the sandal was not really necessary. He admitted that, if his advice were followed, he would be a ruined man, but he had not the least fear that any one would take him at his word.

Sandals of some sort, such as Dr Edwardes recommended, are still used in many parts of the world,

and are of incalculable antiquity. If we again refer to the Egyptian monuments, we shall see that, when the Egyptian men are represented as wearing anything on their feet, it is universally the sandal, laced over the instep by a thong passing between the first and second toes, and turning up in front like the iron of a Dutch skate.

As if to prove the exact accuracy of the details, examples of the sandals themselves have been discovered in the tombs. They are made of papyrus, and though light are exceedingly strong. If the reader will refer to the illustration which represents some Shillooks in the act of crossing the Nile, he will see that their boat-raft is in form an almost exact copy of the papyrus sandal.

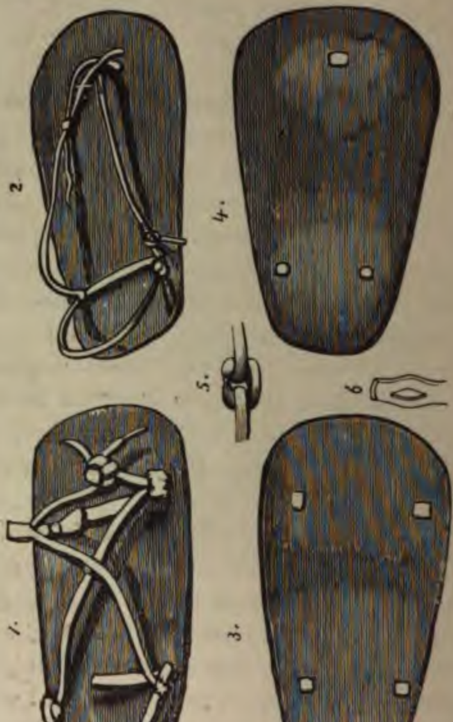
The shoe-sandal, which has no turned-up point, is remarkable for the fact that it is identical in shape with a form of sandal which is still worn in Japan, and which, were it not for the difference of material, might easily be mistaken for it.

Among the Hottentots we find a sandal which is identical in principle with that of ancient Egypt, the times of the Cæsars, and modern Japan.

These sandals are made from raw hide, and are so simple that a pair can be made in a few minutes, the same animal furnishing both the sandals and the thongs. The sandals are taken from the shoulders, where the hide is always thickest and strongest, and the thongs are cut from the thinner skin of the flanks.

As a rule, the Hottentot does not wear any
tection to his feet. He defends his ankl

thorns or sharp stones by encircling them with broad rings of hide, but seldom if ever wears his sandals, except when he is undertaking a long journey over rough ground.



Hottentot Sandals.

As a contrast to these sandals, I may mention the enormous boots which are worn by the Eskimos, and which serve, not only as boots, but as pockets for the reception of various personal belongings.

The mocassin of North America is simply a sandal large enough for the sides to be brought together over the instep, and is so simple in construction that in ten minutes after a deer is killed its slayer will be wearing mocassins made of its hide. I may mention that, in pronouncing the word mocassin, the accent is laid on the first syllable.

THE varieties of boots, shoes, and sandals (including armour) are far too numerous even to be mentioned, and I therefore will content myself with a short description of some accessories to the feet which are neither boots, shoes, nor gaiters.

Snow-shoe.
(From my Collection.)

The first of these appliances is the Snow-shoe,—an article so absolutely necessary in Northern America that man could not sustain life without it. In the strict sense of the word, it is not a shoe at all, but a movable platform, large enough to sustain the weight of a man upon snow, and light enough to be carried over the snow by the action of walking.

There are many forms of snow-shoe, but al'

made on the same principle, *i.e.*, a light wooden frame, filled in with a network of thongs. In fact, a magnified tennis racket would make a very fair snow-shoe.

I mentioned just now that the snow-shoe was carried over the snow by the action of walking. The term is scarcely correct, but there is no other. The snow-shoe is attached to the foot by means of thongs, and the movement is more akin to skating than walking, the necessary play to the foot being given by the aperture in the shoe.

These instruments may be seen in their glory at the annual Ice Carnival at Montreal, when the great ice palace is stormed, and the torchlight procession of snow-shoe wearers sweeps past it. But the snow-shoe is not used so much for amusement as for the sterner necessities of daily existence.

During the winter-time, when the whole face of the country is covered with snow, locomotion would be impossible but for the snow-shoe. The native hunters, for example, pursue the large game, such as the moose and bison, through the snow, and can kill them without difficulty, the heavy animals being hindered by the snow at every step, while the hunter is enabled to skim lightly over the surface.

I only know of one case where the snow-shoe was put to practical use in this country, and that was in the terrible storm of January 18, 1881, of which, by the way, I was one of the victims, having to travel from Winchester to Norwood.

The country was buried so deeply in the powdery snow that even to cross the road was often impos-

Hunting with Snow-shoes.

sible, and the Post-Office was paralysed. There happened to be, however, a gentleman who was a skilled snow-shoe wearer, and who had his shoes with him. He went to the Post-Office, and in the most spirited manner acted as a deputy mail-carrier, distributing letters in places which no one but himself could reach.

In many parts of Northern Europe, the "skidor," or snow-skate, takes the place of the snow-shoe. The skidor are two very narrow wooden planks, between three and four inches in width, about eight or ten feet in length, and turning up in front, like the old-fashioned skate-irons. They enact the same part that the snow-shoe does, but in a different way, distributing the weight of the wearer "fore and aft," as a sailor would say, and not over a short and wide surface, like the snow-shoe.

In the winter, all hunting is carried on by means of the skidor, and travellers are never tired of admiring the skill and swiftness with which skidor-wearers glide over the level snow, or dart down hills, avoiding obstacles with the ease of accomplished skaters. On the return home, the skidor are always placed upright outside the house, and leaning against the walls, so that a stranger who does not know their use is apt to mistake them for very long stilts.

I may here mention that the "mud-pattens," so largely used on the great mud-flats that are found here and there on our shores, are used in precisely the same manner as the snow-shoes. All these three adjuncts agree in being extremely awkward to a beginner, invariably tilting forward, getting the fore

part sunk, and ignominiously flinging the wearer on his face. So, no one dares to venture on the snow or mud alone until he has thoroughly mastered the snow-shoe, skidor, or patten, as he would almost certainly be stifled before he could recover himself.

MOST of my readers must have heard of the shepherds of the Landes, in the south-west of France, who are obliged to use a very different adjunct to the foot. The district which they inhabit is of great extent, and so flat that the range of vision is extremely limited. The shepherds, therefore, would be unable to watch their sheep were it not for their ingenuity in devising a plan whereby they can raise themselves from the earth.

They make stilts of very great length, so that they command a considerable extent of horizon. As it would be impossible for them to rest while on the two stilts, they carry a third, which has a little seat affixed to it. When, therefore, they are tired of walking, they place the third stilt on the ground, and rest most of their weight on the seat, and so form a tripodal figure, the feet of the stilts forming the base, and the man the apex.

Stilts are also used in several uncivilised parts of the world.

To look at a Marquesan, such as we may see on page 536, no one would be likely to place him among the stilt-walkers. Yet these people are marvellously accomplished in the art, and, mounted on their stilts, can run over the roughest ground with perfe

They are fond of stilt races, and not only try to distance each other, but the runners endeavour to

Marquesan Stilts. (From the British Museum.)

overthrow their adversaries, while retaining their own balance.

They are very proud of their stilts, lavishing immense pains and no small art in carving the foot-rests. These objects may often be seen in museums, and are almost invariably labelled as examples of New Zealand work.

Stilts of a similar kind are common in many parts of England, mostly as a means for amusement, but sometimes because they are absolutely needed. For example, I knew a school in the Vale of White Horse, where the buildings were on either side of a shallow cutting, through which ran the high road. Now, this part of Wiltshire is situated on chalk, and in rainy weather the road became filled with a soft, white mud, that obliterated the deep wheel-ruts, and rendered the crossing impassable. So each boy and master had his stilts, and, with their assistance, could cross the road dry-shod and unsplashed by the conspicuous and tenacious chalk-mud.

Some of these boys were very expert with their stilts. They would hold tournaments, as described in "Ivanhoe," holding one stilt under the arm like a couched lance, and hopping on the other. Any of them could hop up and down stairs on one stilt, and the most expert could place a ladder against a wall about eight feet high, and walk up the ladder on their stilts. When they had reached the top of the wall, they would remove one stilt, spin round on the other, and walk down again, replacing the foot in its
as the stilt came on the rung of the ladder.

In West Central Africa there is a large tribe

by the name of Apono. They seem to be a lively and hospitable race, greatly differing in these respects from the morose surliness and hatred of strangers which characterises too many of the interior tribes.

Like most African tribes, they are very fond of dances, and especially of the Ocuya, or Giant Dance, which is represented in the illustration.

As in the Mystery performances of the Middle Ages, the giant is made of wickerwork, the man who works the image being mounted on stilts. The Apono giant has an even more than gigantic head, the face being painted white, so as to express the Apono idea of ugliness.

The mouth is represented as open, in order to show that two upper incisors have been knocked out, according to Apono fashion. No matter what a fashion may be, its votaries will always find a reason for it. The Apono reason is, that dogs have teeth in both jaws, while cows have none in front of the upper jaw. So, as it must be conceded that every one ought to look as unlike a dog and as like a cow as possible, it is the duty of every one who has any self-respect to knock out the front teeth of the upper jaw.

The head-dress with which the Apono giant is decorated is made of monkey-skin, and is adorned with plenty of feathers. In spite of the hindrance of the grass-cloth dress, which reaches nearly to the ground, the performer shows great skill on his stilts, and dances and waltzes round and round as deftly as if his feet were resting on the ground.

The Apono Giant Dance.

CHAPTER XXXIX.

MUSIC.

The sense of Rhythm—The Rattle—Dancing-belts, Bracelets and Anklets—The Nut Girdle—Castanets and "bones"—Beetle-wing Rattle—The Piayman and his sacred Rattle or Marakka—Education of the piayman—Supposed powers of the Marakka—Iron Dancing-bells—Cow-bells—Sleigh-bells—The golden bells of the high-priest's robe—The Drum—Orchestral drums—War drums—The Dahoman drum—A fetish drum of West Africa—Stringed instruments—The Goura, or Bow-harp—The ancient Lyre—Arab lyre—Rababas—The Sansa, the precursor of the Musical Box—Accompaniment to vocal music—The Marimba of Africa—The Harmonicon and Xylophone—Stone harmonicons—The Skiddaw band—Wind instruments—The Whistle—Pandean pipes—The Shofar of the Jews—African war trumpets—The flute—Guianan, Tahitan, and Javanese flutes—The Reed—The Jew's Harp and Harmonium—The Clarinet, Oboe, and Bassoon—The Chinese Mouth-organ.

THE dance naturally leads us to Music, and for the first time we find ourselves treating of an art which is totally unconnected with the duties of life. It is, of course, impossible to compress into a few pages any approach to a history of music, and the utmost that I can do is to give a very slight sketch of a few phases in the progress of the art.

There is no doubt that the most primitive music, or rather approach towards music, did not consist in variations of tone, but in mere rhythmical beats,

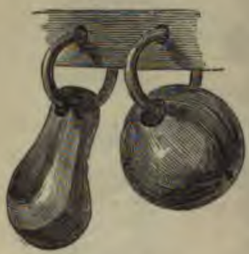
wholly irrespective of tone. So, even in those countries where the inhabitants are cannibals, and where dress is considered a needless superfluity, we find that the natives are fond of jingling and rattling ornaments, which they hang round their necks, waists, wrists, and ankles, and use in their dances.

One of the most common forms of these jingling ornaments is represented in the illustration. It is a girl's dancing-belt, and was made by the Neam-Nam tribe, who have been mentioned more than once in the preceding pages. The belt is made of very strong hide, that of the hippopotamus being preferred. To the belt are attached a number of large nutshells, from which the kernel has been removed. These shells are very hard, and, as they hang loosely on the iron rings by which they are suspended to the belt, they make a

Neam-Nam Girl's Dancing-belt. (From my Collection.)

clatter at every movement. In order to show the mode of construction more plainly, two of these shells are drawn of half their usual dimensions. As the wearer carries one of these belts round her waist, and wears similar belts on her neck, wrists, and ankles, the rhythmical steps of the dance are very boldly marked.

Even at the present day, the castanets of the Spaniards (originally made of nutshells, as the name imports) are survivals of this primitive music, as are the "bones" of the negro minstrel.


Neam-Nam Nut-bells.

The reader may remember that, on page 488, the dancing feather apron of the Amazons was described, and that among its decorations were mentioned a number of wing-cases of a beetle. Perhaps some of my readers may have seen the beautiful Indian fabrics adorned with "beetle-wings." The insect which furnishes them is allied to that which supplies the South American with natural castanets.

In addition to these belts and anklets, which mark every step of the dancer, these people use also a rather complicated set of castanets, which is here represented. It consists of three hoops, made of the ittiritti reed, and hung round with those wing-cases, strung loosely by loops of cotton-thread. It produces much more sound than might be imagined from its appearance.

Mr. H. Bernau, who brought it from Guiana, is of

opinion that this rattle is not used for ordinary purposes, but is employed in the sacred dances, which form so large a part of the worship of semi-civilised peoples in various portions of the world.

Guinan Castanets.

The Piayman, or sorcerer, is held in the estimation by the natives of Guiana, an medicine-men of the Kafir tribes of S

and those of the North-American Indians, is obliged to pass through a regular education, including many severe ordeals, before he is allowed to take rank as a member of the sacred body.

Like many other natives, the Guianan tribes have never known, or, having once known, have lost the idea of one Supreme Being. At all events, though some of them may have a sort of abstract notion on the subject, the worship of the multitude is given to a number of inferior divinities, and, as in the minds of the ignorant power is almost invariably connected with the ability and intention to injure those who are comparatively weak, in consequence, the worship of the Guianans is limited to acts of propitiation, the worshipper only hoping to avert the displeasure of the deities whom he invokes, and never dreaming of asking their help.

Not until the candidate for the piayman's rank has passed all his ordeals is he presented with his emblem of office—the Marakka, as it is called. This is a spherical gourd attached to a handle and adorned with feathers. It contains a few pebbles, and, when the marakka is shaken so as to produce a rattling sound, the evil deities are driven away, not being able to exist within hearing of the sound.

To obtain a marakka by purchase is impossible, and the only mode by which this instrument can be procured is through the missionaries. Knowing that the piaymen are his most formidable opponents, a judicious missionary uses every endeavour to induce the piaymen to embrace Christianity. As a matter of necessity, when such a convert is made, he is

obliged to surrender his marakka, together with all other adjuncts of his office.

One reason which induces Mr. Bernau, the son of a missionary, to think that the castanets belonged to a

Marakka.

piayman is, that to the end of the vertical cord is attached a small gourd, in which are stones that produce a sound exactly like that of the marakka

The specimen which is here figured may be seen in the British Museum.

We will now revert to the Dancing-belt figured at page 627.

As the Neam-Nam tribe possesses much ability in

Neam-Nam Iron Bells.

iron-working, we naturally expect that some ingenious smith would conceive the idea of copying the nut-shell in iron, and thereby producing a louder and more musical sound.

This is accordingly done, as may be seen from the above illustration. The left-hand specimen is so large that it is used as a Cow-bell, and is very much like the bell which is used for a similar purpose

in many parts of the world. Fig. 3 shows a little bell which is made in exact imitation of a nutshell, and which hangs on a belt just like the object from which it is copied.

The bells which at the present day we hang around the necks of our domestic pets are made on the same principle, and so are the tinkling sleigh-bells which lend such a charm to snow-travel in America. Brass bells of an exactly similar character are in great demand in Borneo, and it is nearly certain that the golden bells which fringed the garments of the Jewish high-priest were similarly formed. That they could have been formed according to our modern models, and rung by clappers, is quite impossible.

NEXT in order comes that almost universal instrument the Drum.

Until comparatively modern times the drum has scarcely deserved the name of a musical instrument even among civilised nations, not being tuned to any particular note, and used almost wholly for marking the accentuation.

As to uncivilised races, they only use the drum as an instrument of noise.

Still, having before our eyes the arrangements of our modern orchestras, in which the performer now requires six drums in order to carry out the intentions of the composer, it is somewhat startling to see in West Central Africa an almost similar arrangement, seven drums, graduated in size, being set in a row, and beaten by two performers. I intentionally

employ the word "beaten," for the idea of playing upon them does not enter the head of the native drummer, all his exertions being directed towards the production of as much noise as possible.

The reader may remember that, in the late Soudanese war, nothing wearied our soldiers so much as the ceaseless drumming of the enemy. Their numbers being comparatively small, they were completely surrounded by the semi-savage soldiery. These races never treat the night after our fashion, as a season of repose, but spend it in talking, visiting each other, smoking, and so forth, taking their sleep just as they can get it.

Consequently, neither by day nor night did the beating of the tom-toms cease. The effect on the nerves of the soldiers was so irritating that they could not sleep. Being fired upon would not have affected them nearly so much, as a soldier must expect to run that risk. But to be surrounded by hundreds of tom-toms, which are incessantly beaten for weeks at a time, is more than a soldier thinks himself called upon to endure.

There is so infinite a variety in the details of the drum, and so close a resemblance in the principle, that I shall only give two specimens, the one being an example of the prevalent type, and the other an exceptional shape.

Both of them are from Africa, the first being the great war drum of Dahomè. This drum is carried on the head of one person, and beaten by another, who follows in the rear of the drum-carrier. Its exterior is often adorned with human skulls and jaw-

bones, each of these objects being considered as a powerful fetish. There are two cord handles to the drum, one on each side, and by means of these handles the bearer is able to hold the drum on her head.

Dahoman War Drum

It may seem strange to write "her" head instead of "his," but the fact is, that in Dahomè the only soldiers who are worthy of the name are women, as has already been mentioned when treating of the razor-sword.

The second drum is a most remarkable instrument.

About twenty years ago I found this drum in a garden belonging to an old retired warrant officer, it was discharging the duty of a flower-pot, and was rapidly decaying. I induced the ancient mariner to rescue it from destruction, and had it thoroughly cleaned. He had brought it himself from the West Coast, but could tell me very little about its use. He said, however, that it was considered as "big fetish," and that when used the hole in the side was covered with spider-web. This seemed rather a strange statement, found from other travellers that he was

right, the web in question being the tough cocoon in which the African spider, like some of our own species, lays its eggs. The cocoon is at first spherical, but the eggs are removed from it, and the cocoon flattened, when it is as tough as felt.

The skin with which the head was covered had long perished. It had been fastened and stretched, not by cords but by pegs, some of which were still visible in their holes.

The whole of this drum is cut out of a log of solid wood, and is about three feet in total height. My classical readers will probably be startled by its exact resemblance to an ancient Gnostic gem. Indeed, the whole character of the instrument betokens a skill in art which seems far beyond West African capabilities.


West African Fetish Drum.
(From my Collection.)

THAT the whole of the stringed instruments which now fill so important a part in music derived their origin from the musical resonance of a stretched bow-string, is evident enough.

Perhaps the most primitive of all these instruments is the Goura of the Bosjesman, which is a strange mixture of the harp and the "Jew's harp"—*i.e.*, jaw's-harp. The string of the bow is attached to a piece

Playing the Goura.

of flattened bustard-quill, which is held to the mouth, as shown in the illustration. As the string is twanged with the fingers, the breath is inhaled and exhaled, and a series of sounds produced.

At the present day, on account of its greater portability, the Jew's harp has almost entirely superseded the goura.

The Kafir uses a very similar instrument. There is, however, no quill, and the sounds are produced by striking the string with a stick—the *plectrum* of the ancients. In order to increase the resonance, the string passes over a hollow gourd.

The celebrated Lyre, of which we read so much, must have been a most imperfect instrument. Even in its best form it had but seven strings.

> Tuque, testudo, resonare septem
> Callida nervis.
>
> HOR., 3 Od. xi.

The mode of handling it was simple enough. In Sir G. Grove's "Dictionary of Music" there is a figure of Apollo playing the lyre. It is held upright, the left hand passing behind it so as to stop the strings with the tips of the fingers, while the plectrum with which they are struck is held in the right hand.

A lyre of almost identical shape is used by the Arabs of the Soudan. The resonant body is a sort of tambourine, and the strings are stopped sometimes with the thumb and sometimes with the fingers of the left hand, while they are struck by the right hand. There is no finger-board, and the sound is very feeble.

In other parts of Africa a much more perfect instrument, called the "Rababa," takes the place of the lyre.

The specimens which are here represented were brought from the Dôr country by Mr. Petherick, and I had an opportunity of trying them.

The strings are tuned by a rather ingenious device.

The upper end of each string terminates in a loop, which passes over the neck, and is loose enough to slide up and down. Beneath each loop a band or ring of strong fibre passes round the neck and fits rather tightly. By a kind of screwing movement it

Dŏr Rababas. (Petherick Collection.)

can be shifted up or down the neck, and the note raised or lowered accordingly.

The right-hand instrument is remarkable for having the neck made of five parallel bars of hard and elastic wood, one for each string.

This is rather a clever device. The neck being unsupported at the top, it is evident that, when one string is tightened, the neck will yield a little, so that all the others are slackened and lose their tone. In this particular instrument, however, the inconvenience of retuning every string is almost entirely avoided, the strain coming practically on the individual rod to which the string is attached.

In all these instruments the uppermost string is much the longest, and therefore deepest in tone, and is used as a "drone" with the shorter strings.

For the shape of our modern Harp and its long sound-board we are indebted to the ancient Egyptians. The Harpsichord of the last century was nothing but a harp laid flat, the strings being twanged by pointed pieces of quill. When I was a child, a harpsichord with two manuals was in my father's house at Oxford, and the movements of the "jacks," as these quills were called, was a ceaseless source of amusement to me.

The Pianoforte is practically three harps, the strings of which are struck by hammers instead of being plucked by quills.

The two remarkable objects which we here show are specimens of African musical instruments. The first, which is called the Sansa, has a very large range, both geographically and ethnologically extending over the greater part of Central Africa, and being used by many tribes.

As the reader will at once see, the instrument is the precursor of the Musical Boxes and the "French Organs" of the present day, the sound being pro-

duced by the vibration of a flat tongue, sometimes of wood, sometimes of bone, and sometimes of metal. The specimen which is here figured is one of the best examples, the tongues being of iron, and the body of the instrument made hollow, so as to insure greater resonance. When played, the instrument is held with the base pressed against the body of the player, the tongues being struck by the thumbs.

The common sansas have merely a flat board by way of a body, and the tongues are made of wood.

The Sansa.

The sansa is to Central Africa what the guitar is to Spain. It is used as an accompaniment to the voice, especially in the long improvisations in which these people delight. The sansa not only supports the voice, but, when the singer is at a momentary loss for a word or a phrase, a few notes from the sansa can be thrown in so as to gain time.

The second instrument is the Marimba, which has, in one form or another, even a greater range than the sansa.

have a variation of the instrument, in which a number of graduated metal pots are substituted for the wooden rods.

In our own country it has long been known under the name of Harmonicon, strips of glass or metal being used instead of wood. Still the marimba, not in the least altered as far as design goes, but only improved by the addition of notes and the quality of the wood, has of late years made its way under the name of Xylophone.

Strips of hard stone are sometimes used for the same purpose, and some of my readers may remember the "Skiddaw Band," so called from the locality where the stones were procured. The performers consisted of a father and two sons, and the rich, powerful tones of the bass, together with the softness of the intermediate parts and the telling brilliancy of the upper notes, seemed far beyond the capabilities of such an instrument. The father, who took the bass, used double hammers, so that he could strike the whole of the common chord at once.

WIND instruments come next on our list, and demand a short notice.

There is no doubt that the first wind instruments produced their sound by being blown across the orifice, just as when a key is converted into a whistle. A very simple form of this kind of wind instrument is here figured. It is made of either bone or ivory, and is used by the Kafirs in calling their cattle. Not that a Kafir stands in much need of any artificial

whistle, as any one who has heard him can testify. With his lips alone he can produce a whistle of astonishing volume and shrillness, while, with the aid of his fingers, he can nearly deafen any one who has the misfortune to be near him.

Kafir Whistles.

The note which is produced by the whistle here shown depends upon the length of the tube, just as in organs. It is impossible to change the note of such a whistle except by extreme forcing of the sound, when it leaps up a whole octave. If, therefore, a succession of sounds be needed, several whistles must be used, as seen in the next figure, which the reader will recognise as the Pandean pipes.

They look as if they might have belonged to Mr. Codlin (of the firm of Codlin and Short), and have accompanied Punch and Judy through their performances. Yet the instrument came from Tahiti, and the classical reader will remember that instruments of a similar structure are of unknown antiquity.

Sometimes, as in the flute, the aperture is at the side of the instrument instead of the end, but is still

blown transversely. Even when the whistle assumes such dimensions as to earn the name of trumpet, it is blown crosswise. The true trumpet, with the cup-like mouth-piece by which the lips can act upon the enclosed column of air, and produce a series of harmonics, is not of African birth, and I am inclined

Pandean Pipes from Tahiti.

to attribute it to Asia. The earliest form of a true trumpet is probably the Shofar, or Ram's-horn trumpet, used by the Jews up to the present day.

In all the books of travels into Africa, we read of the war drum and the war trumpet. Three examples of war trumpets are here given.

The two left-hand trumpets are made of elephants' tusks, hollowed out by long and patient labour, while the third figure represents a trumpet made of separate pieces of ivory and wood lashed together. These large trumpets are only used by officers of high rank, those of inferior station being furnished with bone whistles, like those of the Kafirs. There is, in consequence, no danger of mistaking the commander's order for that of a subaltern's.

Some of these trumpets are covered with most elaborate carvings, but want of space compels me to omit them.

I have mentioned that the wind instruments which do not possess a trumpet mouth-piece can only pro-

Ivory War Trumpets—Central Africa.

duce one note and its octave. But, if it be possible to shorten or lengthen the column of air at will, the

number of notes can be greatly increased. This can be done by boring holes at certain distances along the tube.

If all these holes be closed, the sound will be that which is produced by the entire length of the tube, and therefore the lowest which is possible for the instrument. If the hole nearest to the end be opened, the enclosed vibrating column of air is shortened, and a correspondingly higher note produced. Our modern flute, clarionet, oboe, &c., are played on this principle, which is a very old one, and has been discovered by uncivilised natives in various parts of the world.

Here, for example, is a sort of flute brought from Guiana. It is made from the leg bone of the jaguar, and the owner has prized it so highly that he has adorned it with a tuft of feather-charms. By the

Jaguar

side of this instrument is seen a bunch of charms which was attached to another specimen. Both these instruments may be seen in the British Museum.

I might give numberless examples from different parts of the world, but can only find space for one more flute, in order to show that the same principle can be discovered by uncivilised man in very different parts of the earth. The flute in question comes from Tahiti, and may be compared with the pandean pipes which are figured on page 645.

I may casually mention that the Siamese and Japanese also employ flutes pierced with finger-holes, some of them being so long that the hands are held

Tahitan Flute.

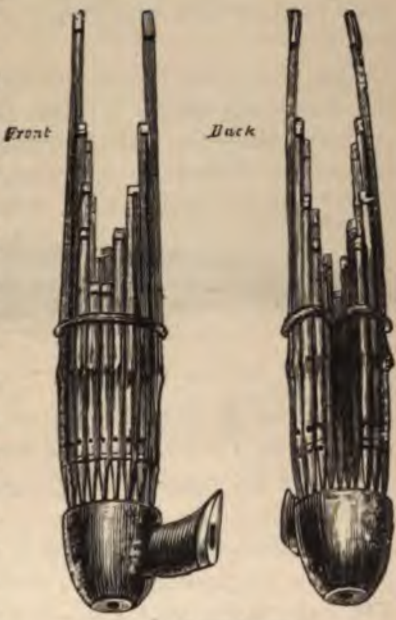
quite widely apart when the most distant holes have to be closed, and so small in diameter that they resemble fishing-rods or billiard-cues rather than flutes.

WE will conclude this chapter with a few words on the "Reed," or vibrating tongue, which may be divided into two in the Jew's harp, Concertina, and Harmonium. These are called "free" reeds, and have already been mentioned in connexion with the "goura," or mouth harp of the Bosjesman. See page 637.

The Chinese Mouth Organ, which is here shown, is an example of the free reed. The sixteen pipes pass

into a common wind-box, so that, when the performer blows into the mouth-piece, they would all sound at once.

At the lower end of each pipe is a free reed, which, of course, cannot vibrate if the holes be stopped. As there are only five fingers on each hand, it would be impossible to stop even fifteen of the pipes. In point of fact, only eight of them are speaking pipes, the others being only dummies, having no reed, and only inserted for the sake of appearance.



Chinese Mouth Organ.
(From my Collection.)

Reeds belonging to the second division are termed "beating" reeds, and are set edgewise in the instrument. Such are the mouth-pieces of the clarionet, oboe, bassoon, and all the organ pipes which go under the name of "reed" stops.

The simplest form of the beating reed is familiar to all of us who have been boys at school, especially if the school be in the country. If the two thumbs be

CHAPTER XL.

THE PIPE.

Importance of the Pipe in the history of man—Its antiquity and almost universal use—The Calumet of North America, and its sacred character—Material of the bowl—The sacred quarry—The Pipe-bearer and his office—Comparison with the ancient Heralds—The elephant pipe of America—Discovery of the pipe—The maker contemporary with the Mastodon—A Kafir elephant snuff-box—Stone pipes of the Aht tribes—Human figures and faces—Hemp-smoking—The Water-pipe—The Narghili, Hookah, and Hubble-bubble—The Chinese water-pipe—Opium-smoking.

ONE remarkable phase in the history of man, and the handiwork which removes him so far from the lower animals, has lately assumed an unexpected importance.

Every one knows that the custom of tobacco-smoking is of comparatively recent introduction into Europe, and it is generally thought that, as tobacco is a product of America, the pipe was introduced into the Old World from the New. Yet, from time immemorial, the natives of various parts of Africa have been in the habit of inhaling the smoke of herbs, and the same may be said of many parts of Asia. When tobacco became known to them, they made a good exchange in accepting the foreign and less injurious substitute for their native herbs.

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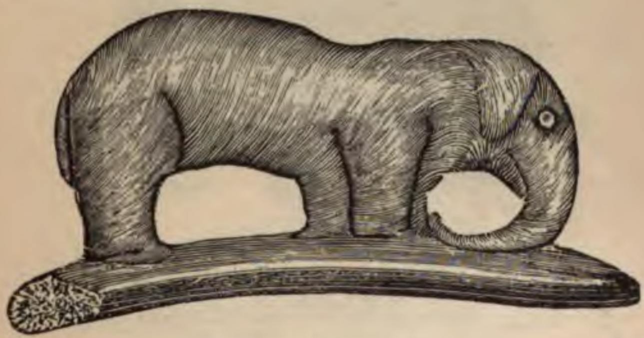
morial is well known, but until the last few years, no one suspected their exceeding antiquity.

On January 10, 1877, the Davenport (Iowa) Academy of Natural Sciences was engaged in excavating the extraordinary earth-mounds which exist in the neighbourhood. The chief explorer was the Rev. Jacob Gass, a Lutheran minister in Davenport, assisted by two other members of the academy, and five persons who were accidentally present. At some depth and under several layers of shells was found the remarkable stone pipe, a figure of which I am enabled, by the kindness of the academy, to present to my readers.



Elephant (or Mastodon) Pipe.

Here is a wonderful thing! There can be no doubt that the figure is that of an elephant, and yet it was found among pre-historic relics in America! There can be but one explanation, *i.e.*, that the pipe represented the Mastodon, a creature whose remains are plentifully found in America, an entire and perfect skeleton being in the Warren Museum, Boston.

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not a pipe, but a snuff-box, so that it is devoted to the service of tobacco, though in a different form. It was made by some ingenious Kafir in the following way.

While scraping the inner surface of an ox-hide, in order to preserve it, the operator removes a quantity of blood and small fibres. When he has gathered enough of this material, he mixes it with very finely-

Aht Pipes.

powdered earth, so as to make it into a stiff paste. Having previously prepared a clay model and dried it in the sun, he spreads the blood paste over it, and allows it to dry. When it is quite hard, he cuts off the head, picks out all the clay with his needle (see page 481) and then converts the head into a stopper.

In Mr. Bragge's wonderful collection of the pipes of all nations, two great clay pipe-bowls were exhibited. They came from Central Africa, and represented the gorilla.

Short stone pipes of a somewhat similar character are still made by the Aht tribes, and are carved out of a kind of slate. The uppermost pipe was in my collection, and the other, two views of which are given, belonged to the late T. W. Wood, Esq. Their length is about eight inches.

Zulu Water Pipe.

On page 651, I mentioned that in the old world men were accustomed to smoke herbs which were far more hurtful than tobacco.

One of these injurious herbs is hemp, the smoke of which has not only an intoxicating, but a maddening nature. It is from hemp that the celebrated "haschish" is made, and from which the word assassin, literally "haschishan," *i.e.*, maddened with haschish, is derived. Hemp furnishes the "bhang," with which the Indian fanatics are wont to drug their senses into fury before flinging themselves against

the supposed enemies of their faith. They not only have no regard for their own lives, but do not intend to live. They devote themselves to death, and all their care is to kill as many of the enemy as possible before they are slain.

Another preparation, called "dakka," or "dagha," is smoked throughout South Africa, and mostly in the curious water-pipe which is here figured. When the pipe is used, the horn is nearly filled with water, and, as the stem of the pipe passes into the water, all the smoke is washed before it enters the mouth.

When dagha is used with these pipes, the mouth is placed over the upper end of the horn, and the lips closed round it. A deep inhalation is then taken, so as to fill the lungs with smoke, and the pipe is then passed to the next man. A single inhalation is all that can be taken, as in a minute or so the smoker is lying insensible on the ground. Sometimes a man never recovers consciousness, and his health is always affected by the drug, so that the substitution of tobacco for the hemp is an exchange very much for the better.

The practice of washing the smoke by passing it through water is familiar to us in the narghili of Turkey and the hookah of India. In the latter country, a very common and cheap water-pipe, called from the sound which it produces a hubble-bubble, is made of a cocoa-nut and two hollow bamboo rods.

The Chinese have a water-pipe which is exactly similar in principle to that of the Kafir. In this case the horn is made of metal, and its position is reversed.

the smoke being inhaled through the small end This kind of pipe is mostly used by the women.

Chinese Woman's Water Pipe.

The last of the pipes that can be mentioned is the opium pipe of China, the abuse of which has wrought

so much evil. The opium is prepared expressly for the purpose, and forms a sort of paste. A little piece, scarcely so large as a sweet pea, is placed in the tiny aperture at the top of the bowl, and, a flame being held to it, the smoke is drawn into the lungs.

I mention this phase of human existence as showing the common humanity of ourselves at the present day, and of the races who lived and left their handi-

Chinese Opium Pipe. (From my Collection.)

work behind them as the only memorials of a long-vanished epoch. It is impossible, moreover, for any one to contemplate even the simplest example of man's handiwork, be it but a flint-flake or a notched bone, and not to feel that it indicates the impassable gulf which separates the lowest of the human race from the highest of all other inhabitants of the earth.

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WYMAN AND SONS, PRINTERS, GREAT QUEEN STREET, LONDON, W.C.